

EXHIBIT I

***Administrative Settlement Agreement and Order on Consent for a Removal Action for the
Weedsport, New York Site***

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Weedsport, New York Site***

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

IN THE MATTER OF
WR GRACE SUPERFUND SITE
WEEDSPORT, NY

Index Number
CERCLA-02-2012-2003

W. R. GRACE & CO.,

Respondent,

Proceeding under Sections 106(a) and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9606(a) and 9622.

ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT
FOR A REMOVAL ACTION

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent ("Settlement Agreement") is entered into voluntarily by W. R. Grace & Co. ("Respondent") and the United States Environmental Protection Agency ("EPA") and requires Respondent to perform a removal action and pay certain response costs in connection with the WR Grace Superfund Site, Village of Weedsport, Town of Brutus, Cayuga County, New York (the "Site").
2. The Settlement Agreement is issued to Respondent by EPA pursuant to the authority vested in the President of the United States under Section 106(a) and 122(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §§ 9606(a) and 9622(a), and delegated to the Administrator of EPA on January 23, 1987, by Executive Order No. 12580 (52 Fed. Reg. 2926, January 29, 1987). This authority was further delegated to the EPA Regional Administrators by EPA Delegation Nos. 14-14-C and 14-14-D and redelegated within Region 2 to the Director of the Emergency and Remedial Response Division by Regional Order No. R-1200, dated November 23, 2004.

3. Respondent's participation in this Settlement Agreement shall neither constitute nor be construed as an admission of liability or an admission of the Findings of Fact or Conclusions of Law contained in this Settlement Agreement. To effectuate the mutual objectives of EPA and Respondent, Respondent agrees to comply with and be bound by the terms of this Settlement Agreement. Respondent agrees not to contest the authority or jurisdiction of the Director of the Emergency and Remedial Response Division or his delegate to issue this Settlement Agreement, and further agrees that it will not contest the validity of this Settlement Agreement or its terms in any proceeding to enforce the terms of this Settlement Agreement.
4. On April 2, 2001, Respondent filed for protection under Chapter 11 of the United States Bankruptcy Code in the United States Bankruptcy Court for the District of Delaware ("Bankruptcy Court"), In re W. R. Grace & Co., et al., No. 01-01139 (JKF). In connection with its reorganization, Respondent entered into a Multi-Site Settlement Agreement with EPA ("Multi-Site Agreement"). The WR Grace Site is an "Additional Site" under the Multi-Site Agreement and may therefore be addressed in an administrative settlement with EPA. Respondent has also filed a Joint Plan of Reorganization ("Plan"), which was confirmed by the Bankruptcy Court on January 30, 2012, but which is not yet effective. Following EPA certification pursuant to Paragraph 107, of the completion of the Work required by this Settlement Agreement, this Site will be treated and liquidated as an allowed general unsecured claim subject to the terms and conditions under the Multi-Site Agreement.

II. PARTIES BOUND

5. This Settlement Agreement applies to and is binding upon EPA and Respondent and its successors and assigns. Any change in the ownership or corporate status of Respondent, including, but not limited to, any transfer of assets or real or personal property, shall not alter the responsibilities of Respondent under this Settlement Agreement.

III. DEFINITIONS

6. Unless otherwise expressly provided herein, terms used in this Settlement Agreement which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or its implementing regulations. Whenever terms listed below are used in this Settlement Agreement or in an attachment to this Settlement Agreement, the following definitions shall apply:
 - a. "Day" means a calendar day unless otherwise expressly stated. "Working Day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Settlement Agreement, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business on the next working day.
 - b. "Effective Date" means the date specified in Paragraph 111.
 - c. "Future Response Costs" means all direct and indirect costs that the United States has paid or will pay in connection with the Site that are not included in the Cost Summary dated March 29, 2012, attached hereto as Appendix B.
 - d. "Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U. S. C. § 9507, compounded annually, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.
 - e. "Party" or "Parties" means EPA and/or Respondent.
 - f. "Past Response Costs" means the costs paid by EPA through December 31, 2011, and that are included in the Cost Summary dated March 29, 2012, attached hereto as Appendix B.
 - g. "Settlement Agreement" shall mean this Administrative Settlement Agreement and Order on Consent, Index

Number CERCLA-02-2012-2003, and all appendices attached hereto. In the event of conflict between the Administrative Settlement Agreement and Order on Consent and any appendix, the Administrative Settlement Agreement and Order on Consent shall control.

- h. "Site" shall mean the WR Grace Superfund Site, including 4-5 acres within two parcels of land encompassing approximately 78 acres, located on Dunn Road in the Town of Brutus, Cayuga County, New York, bounded on the west by State Route 34, to the east by undeveloped property, to the south by railroad tracks, and to the north by a few residential homes and a farm. See Appendix A for a general depiction of the Site.
- i. "Waste" means (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any "pollutant or contaminant" under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (3) any "solid waste" under Section 1004(27) of the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. § 6903(27); and (4) any mixture containing any of the constituents noted in (1), (2), or (3) above.
- j. "Work" means all work and other activities that Respondent is required to perform pursuant to this Settlement Agreement.

IV. FINDINGS OF FACT AND CONCLUSIONS OF LAW

- 7. Between the 1870's and 1955, the Site property was owned by Lehigh Valley Railroad Company. The Site was purchased by C. Frank Estelle in 1955. In 1963, Respondent entered into an agreement with Mr. Estelle to lease the Site, which included a processing building that was erected by Mr. Estelle, and four silos that were erected on the Site by Respondent.
- 8. From 1963 through 1989, Respondent conducted operations at the Site building to exfoliate vermiculite concentrate, some of which may have contained asbestos, originating from a mine in Libby, Montana. During its operations at the Site,

Respondent processed between 81,000 and 145,000 tons of vermiculite concentrate which came from Libby, Montana, some of which contained asbestos, including the movement of vermiculite from an outdoor railroad siding. No other asbestos operations took place at the Site. Following closure of Respondent's operations in 1989, the four silos were removed, but the processing building was cleaned and left intact. Since 1989, one company has used the Site to manufacture coconut mulch. As of today, the building at the Site is vacant.

9. In June 2006, EPA conducted air sampling inside the former processing building at the Site. Asbestos was present inside the building at concentrations above 0.002 fibers per cubic centimeter ("f/cc").
10. In September 2008, EPA's Office of Solid Waste and Emergency Response ("OSWER") developed a national framework for evaluating asbestos at Superfund sites (OSWER DIRECTIVE #9200.0-68).
11. In October 2010, EPA collected outdoor air and soil samples at the Site which were analyzed for the presence of asbestos. The air samples were collected at seven stationary sample locations and one activity-based location involving brush-hogging (*i.e.*, the mechanical cutting of brush to release dust particles into the air). The soil samples were collected from shallow (0-1 foot) and deeper (1-2 feet) depths.
12. Three of the stationary air sampling results had concentrations that exceeded the Site screening value of 0.0009 f/cc, with values ranging from 0.0009 f/cc to 0.008 f/cc. The samples collected at the activity-based locations showed asbestos concentrations in air ranging from 1.31 f/cc to 7.87 f/cc.
13. Using polarized light microscopy and a 400 point count analysis, the Site soil sampling results showed asbestos ranging from non-detect to above 1% in the shallow depths and two deep soil samples showing asbestos above 0.75%. Asbestos in the soil at this Site, if disturbed, could result in levels of asbestos in air at the Site in excess of the EPA air screening level.

14. Asbestos is a "hazardous substance" within the meaning of Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).
15. The Site constitutes a "facility" within the meaning of Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
16. Respondent is a corporation organized in Delaware, and is therefore a "person" within the meaning of Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
17. Respondent operated at the Site at a time of disposal of a hazardous substance at the Site. Respondent is thus a responsible party within the meaning of Sections 107(a) (2) of CERCLA, 42 U.S.C. § 9607(a) (2).
18. The presence of asbestos, both in the air and in the soils at the Site, constitutes a "release" or threat of "release" of a hazardous substances into the environment, as the term "release" is defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).
19. Respondent has been given the opportunity to discuss with EPA the basis for issuance of this Settlement Agreement and its terms.

V. DETERMINATIONS

20. The conditions present at the Site constitute a threat to public health, welfare, or the environment based upon factors set forth in Section 300.415(b) (2) of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. § 300.415(b) (2). These factors include, but are not limited to, the following conditions:
 - a. actual or potential exposure to nearby human populations, animals or the food chain from a hazardous substance or pollutant or contaminant;
 - b. high levels of a hazardous substance or pollutant or contaminant in soils largely at or near the surface, that may migrate; or
 - c. the unavailability of other appropriate federal or state response mechanisms to respond to the release.

21. EPA has determined that a removal action at this Site is necessary to address the release or threat of release of a hazardous substance or pollutant or contaminant at the Site.
22. The actions required by this Settlement Agreement are necessary to protect the public health or welfare or the environment, are in the public interest, and, if carried out in compliance with the terms of this Settlement Agreement, will be considered to be consistent with the NCP.
23. Based upon the Findings of Fact and Conclusions of Law set forth above, and the administrative record supporting this removal action, EPA has determined that the actual or threatened release of a hazardous substance from the Site may present an imminent and substantial endangerment to the public health, welfare or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a), and it is hereby agreed and ordered that Respondent shall undertake a removal action at the Site, as set forth in Section VI (Work To Be Performed), below.

VI. WORK TO BE PERFORMED

A. Designation Of Contractor and Designated Project Coordinator

24. Within ten (10) days after the Effective Date of this Settlement Agreement, Respondent shall select a coordinator, to be known as the Project Coordinator, and shall submit the name, address, qualifications, and telephone number of the Project Coordinator to EPA. The Project Coordinator shall be responsible on behalf of Respondent for oversight of the implementation of this Settlement Agreement. The Project Coordinator shall not be an attorney engaged in the practice of law. He or she shall have the technical expertise sufficient to adequately oversee all aspects of the Work contemplated by this Settlement Agreement. Respondent shall ensure that all Work requiring certification by a professional engineer licensed in the State shall be reviewed and certified by such. The Project Coordinator shall be knowledgeable at all times about all matters relating to the Work being performed under this Settlement Agreement.

25. Selection of the Project Coordinator shall be subject to approval by EPA in writing. If EPA disapproves a proposed Project Coordinator, Respondent shall propose a different person and notify EPA of that person's name, address, telephone number and qualifications within seven (7) days following EPA's disapproval. Respondent may change its Project Coordinator provided that EPA has received written notice at least seven (7) days prior to the desired change. All changes of the Project Coordinator shall be subject to EPA approval.
26. EPA correspondence related to this Settlement Agreement will be sent to the Project Coordinator on behalf of Respondent. To the extent possible, the Project Coordinator shall be present on-Site or readily available for EPA to contact during all working days and be retained by Respondent at all times until EPA issues a notice of completion of the Work in accordance with Paragraph 107. Notice by EPA in writing to the Project Coordinator shall be deemed notice to Respondent for all matters relating to the Work under this Settlement Agreement and shall be deemed effective upon receipt.
27. All activities required of Respondent under the terms of this Settlement Agreement shall be performed only by well-qualified persons possessing all necessary permits, licenses, and other authorizations required by Federal, State, and/or local governments consistent with Section 121 of CERCLA, 42 U.S.C. § 9621, and all Work conducted pursuant to this Settlement Agreement shall be performed in accordance with prevailing professional standards.
28. Respondent shall retain at least one contractor to perform the Work. Respondent shall notify EPA of the name and qualifications of a proposed contractor within ten (10) days of the Effective Date of this Settlement Agreement. Respondent shall also notify EPA of the name and qualifications of any other contractor or subcontractor proposed to perform Work under this Settlement Agreement at least ten (10) days prior to commencement of such Work.
29. EPA retains the right to disapprove of any, or all, of the contractors and/or subcontractors proposed by Respondent to conduct the Work. If EPA disapproves in writing of any of Respondent's proposed contractors to conduct the Work,

Respondent shall propose a different contractor within seven (7) days of receipt of EPA's disapproval.

30. Respondent shall provide a copy of this Settlement Agreement to each contractor and subcontractor approved and retained to perform the Work required by this Settlement Agreement. Respondent shall include in all contracts or subcontracts entered into for Work required under this Settlement Agreement provisions stating that such contractors or subcontractors, including its agents and employees, shall perform activities required by such contracts or subcontracts in compliance with this Settlement Agreement and all applicable laws and regulations. Respondent shall be responsible for ensuring that its contractors and subcontractors perform the Work contemplated herein in accordance with this Settlement Agreement.

B. Description of Work

31. Respondent shall perform, at a minimum, all actions necessary to implement the Work set forth in this paragraph. The actions to be implemented include, but may not be limited to, the following:
 - a. installation and maintenance of a chain link security fence along the northern border of the Site near Dunn Road until the Work is completed;
 - b. excavation within the approximate 4-5 acre area of the Site generally depicted in Appendix A, of all soil containing amphibole asbestos fibers (hereinafter referred to as "asbestos fibers"), greater than or equal to 0.25% using "Standard Operating Procedures of CARB 435 Analysis", 400 point count, incorporating field of view in the analysis. Once the cleanup standard of less than 0.25% is achieved, activity-based sampling shall be conducted in the excavation area using a clearance standard of 0.01 f/cc in air to confirm that the cleanup level of 0.25% has been effective;
 - c. post-removal Site controls, including institutional controls, shall be implemented based on the results of the activity-based

sampling if such sampling shows that the Site does not allow for unlimited use and unrestricted exposure;

- d. building decontamination, which shall include but not be limited to, cleaning the inside of the building and capturing all rinsate, if rinsate is utilized (with proper off-Site disposal of rinse water), in order to remove asbestos fibers and materials containing such asbestos fibers from the building;
 - e. post-decontamination clearance sampling to ensure that indoor air within the building meets risk-based criterion of 0.01 f/cc utilizing aggressive air sampling procedures and using methods specifically designed for counting asbestos structures classified as Phase Contrast Microscopy Equivalent fibers;
 - f. proper characterization, transportation and off-Site disposal of the contaminated soil and any waste generated during building decontamination;
 - g. post-excavation soil sampling and analysis at the Site to ensure the asbestos contamination in the soil is less than 0.25% in samples collected and analyzed using the methods described in subparagraph b., above;
 - h. backfilling of excavation areas and Site restoration; and
 - i. any other investigations, studies, and response actions as Respondent may propose and EPA may approve in accordance with this Settlement Agreement.
32. Within thirty (30) days of the Effective Date of this Settlement Agreement, Respondent shall submit to EPA for review and approval a detailed Site Operating Plan ("SOP") for the Work in accordance with this Settlement Agreement, CERCLA, the NCP, EPA's relevant guidance documents and other applicable Federal and State laws and regulations. This SOP shall include the following:

applicable Federal and State laws and regulations. This SOP shall include the following:

- a. Site Work Plan;
 - b. Transportation and Disposal Plan;
 - c. Site Health and Safety Plan;
 - d. A Decontamination Plan; and
 - e. Quality Assurance Project Plan ("QAPP"), which shall include a plan for sampling and analysis.
33. The Site Work Plan shall discuss the proper characterization, excavation, staging, handling, sampling and analysis of all materials containing asbestos at the Site, and at a minimum, address the following:
- a. Mobilization, including set-up of office, laboratory, and decontamination trailers as necessary to properly support field activities under this Settlement Agreement and establishment of work zones including, but not limited to a support zone, contamination reduction zone, and exclusion zone. Maps must be prepared to depict all work and safety zones including staging and sampling areas, waste segregation areas, command posts and decontamination areas all located from fixed points and plotted to scale.
 - b. Proposed Time Line for the completion of all on-Site activities and all other requirements of this Settlement Agreement. The schedule shall provide for completion of all soil excavation work no later than ninety (90) days from the date of EPA approval of the SOP, and all other field work no later than one hundred and twenty days (120) days from the date of EPA approval of the SOP.
 - c. Procedures for excavating, handling and storing of decontamination water, contaminated soil, and other wastes, to prevent the release of hazardous substances to the environment including runoff control, proper water management and containment, emissions management and erosion control.

- d. A description of any potential dewatering activities, should it prove necessary. The description must include a description of how the water will be stored during the excavation activities as well as a description of the final disposition of the water.
 - e. A plan for restoring the Site. Soil brought to the site for use as backfill shall meet the requirements specified in NYCRR Subpart 375-6.7(d).
 - f. A plan for providing Site security including, but not limited to, orange construction fencing approximately 3 feet high and secured using steel posts around the outer perimeter of the excavation area, and any other measures to be taken to keep unauthorized personnel from entering restricted work areas and the Site for the duration of the cleanup.
34. The Transportation and Disposal Plan shall outline procedures for the proper transporting and disposing of all hazardous substances, pollutants and contaminants, hazardous waste and any solid waste generated during the Work. The Plan will include the identification of the proposed disposal facilities for all waste streams and include waste profile information, facility acceptance documentation, and analytical characterization of each waste stream. In addition the Plan will include the following information to be determined and documented by Respondent:
- a. the valid RCRA transporter and disposal identification numbers for each proposed transporter and disposal company;
 - b. the most recent six-month State or EPA regulatory inspection results of each disposal company;
 - c. documentation of the current permit status of proposed transporters and disposal facilities; and
 - d. the date of the most recent State or EPA regulatory inspection of each proposed disposal company, and any special provisions or conditions attached to the RCRA disposal permits as a result of the most recent inspection.

Respondent shall provide all of the information required in a. - d. above to EPA's On-Scene Coordinator ("OSC") 7 days prior to shipping any waste off the Site.

After permitted disposal facilities have been identified, all wastes shall be properly manifested and shipped off-Site via permitted transporters. All final signed manifests, bills of lading and certificates of destruction or disposal will be provided to the OSC upon receipt by Respondent.

35. The Site Health and Safety Plan ("H&S Plan") shall ensure the protection of the public health and safety during performance of on-Site work under this Settlement Agreement. This plan shall be prepared in accordance with the "EPA Standard Operating Safety Guide" (PUB 9285.1-03, PB 92-963414, June 1992). In addition, the plan shall comply with all currently applicable OSHA regulations found at 29 C.F.R. Part 1910 and New York State Department of Labor ("NYSDOL") Asbestos regulations (12 NYCRR Part 56). The plan shall also include contingency planning. Respondent shall incorporate all changes to the plan required by EPA and shall implement the plan during the duration of the removal action. The Site H&S Plan, at a minimum, shall address the following:

- a. Delineation of the work zones;
- b. Personnel monitoring requirements, paying particular attention to monitoring specific job functions in compliance with OSHA requirements;
- c. Personal protective equipment requirements, including but not limited to, Level C personal protection as required for asbestos removal, during any mowing or brush-hogging and collecting of vegetation as well as removing any obstacles that will hinder excavation, and upgrade thresholds based on real-time perimeter air monitoring throughout the entire vegetation and soil removal process;
- d. Demonstration that all personnel, including subcontractor personnel, have current certifications as per applicable OSHA and NYSDOL regulations;

- e. A dust control plan to be submitted by Respondent and approved by EPA prior to the commencement of work; and
- f. Compliance with OSHA requirements for Health and Safety Plans.

If performance of any subsequent phase of the work required by this Settlement Agreement requires alteration of the H&S Plan, Respondent shall submit to EPA for review any proposed amendments to the H&S Plan. Respondent shall incorporate all changes to the H&S Plan required by EPA and shall implement such changes to the H&S Plan.

- 36. The Decontamination Plan shall include detailed procedures for construction of the decontamination area and the final decontamination of all personnel and equipment used at the Site during all field activities including exiting the hot zone.
- 37. The QAPP shall contain the following:
 - a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to EPA policy and guidance regarding sampling, quality assurance, quality control, data validation, and chain of custody procedures. Respondent shall incorporate these procedures in accordance with the Uniform Federal Policy for Implementing Quality Systems ("UFP-QS"), EPA-505-F-03-001, March 2005; Uniform Federal Policy for Quality Assurance Project Plans ("UFP-QAPP"), Parts 1, 2, and 3, EPA-505-B-04-900A, B, and C, March 2005 or newer; and other guidance documents referenced in the aforementioned guidance documents. Subsequent amendments to the above, upon notification by EPA to Respondent of such amendments, shall apply only to procedures conducted after such notification.
 - b. If performance of any subsequent phase of the work required by this Settlement Agreement requires alteration of the QAPP, Respondent shall submit to EPA for review and approval proposed amendments to the QAPP.
 - c. Respondent shall conduct the appropriate level of data verification/validation and provide the specified data deliverables as provided in the EPA-approved QAPP.

- d. The QAPP shall require that any laboratory utilized by Respondent is certified for the matrix/analyses which are to be conducted for any work performed pursuant to this Order, by the National Voluntary Laboratory Accreditation Program certification accredited for asbestos analysis, or a certification issued by a program conducted by a state, and acceptable to EPA, for the analytic services to be provided. The QAPP shall require the Respondent to submit laboratory certificates from such accreditation programs that are valid at the time samples are analyzed. If a specific analytical service is unavailable from a certified laboratory, EPA may within its discretion, approve Respondent's utilization of a laboratory that is not certified. EPA approval shall be based on Respondent's submittal of a written request, submittal of the laboratory quality assurance plan, and the laboratory's demonstration of capability through the analysis of Performance Evaluation samples for the constituents of concern.
- e. In its contract(s) with laboratories utilized for the analyses of samples, Respondent shall require granting access to USEPA personnel and authorized representatives of the USEPA to the laboratories for the purpose of ensuring the accuracy of laboratory results related to the Site.
- f. For any analytical work performed under this Agreement and Order, including but not limited to that performed in a fixed laboratory, in a mobile laboratory, or in on-site screening analyses, Respondent shall submit to EPA, within thirty (30) days after acceptance of the analytical results, a "Non-CLP Superfund Analytical Services Tracking System" form with respect to each laboratory utilized during a sampling event. Each such form shall be submitted to the EPA OSC, and a copy of the form and transmittal letter shall also be sent to:

Regional Sample Control Center Coordinator (RSCC)
USEPA, Division of Environmental Science &
Assessment, MS-215
2890 Woodbridge Avenue
Edison, New Jersey 08837.

38. The QAPP shall include detailed procedures, methods and sampling parameters to be implemented to sample and analyze the contaminants found in Site soils that are required for off-Site transport and disposal, and to insure proper staging of containerized materials into compatible waste groups for disposal. The QAPP will also include detailed procedures, methods, and sampling parameters to be utilized for post-excavation sampling of soil and infiltrating groundwater in the areas of excavation to establish criteria for determining completion of the waste and contaminated soil removal. The QAPP will include maps depicting proposed sampling locations. Appropriate sampling and analysis methods (e.g., sample frequency, compositing techniques, etc.), as necessary shall be utilized for the proper disposal of contaminated soil and containers.
39. Upon request by EPA, Respondent shall allow EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by Respondent while performing Work under this Settlement Agreement. Respondent shall notify EPA not less than seven (7) days in advance of any sample collection activity.
40. EPA either will approve the SOP, or will require modifications thereto pursuant to Section VII (Plans and Reports Requiring EPA Approval), below. Upon its approval by EPA, the SOP shall be deemed to be incorporated into and an enforceable part of this Settlement Agreement.
41. Within fifteen (15) days after EPA's approval of the SOP, Respondent shall commence the Work described in the EPA-approved SOP. Respondent shall fully implement the EPA-approved SOP in accordance with the terms and schedule therein and in accordance with this Settlement Agreement. All Work requirements of this Settlement Agreement shall be completed within six (6) months of the Effective Date of this Settlement Agreement.
42. Respondent shall notify EPA of the names and addresses of all off-Site Waste treatment, storage, or disposal facilities selected by Respondent to receive Wastes from the Site. Respondent shall provide such notification to EPA for approval at least five (5) days prior to off-Site shipment of such Wastes.

43. At the time of completion of all field activities required by this Settlement Agreement, demobilization shall include sampling if deemed necessary by EPA, and proper disposal or decontamination of protective clothing, remaining laboratory samples taken pursuant to this Settlement Agreement, and any equipment or structures constructed to facilitate the cleanup. Respondent shall insure that the Site is restored to conditions similar to those that existed prior to the commencement of the Work.
44. Respondent shall conduct the Work required hereunder in accordance with CERCLA and the NCP, and in addition to guidance documents referenced above, the following guidance documents:

EPA Region 2's "Clean and Green Policy" which may be found at http://www.epa.gov/region02/superfund/green_remediation/policy.html, and Guide to Management of Investigation-Derived Wastes (OSWER Publication 9345.3-03FS, January 1992), as they may be amended or modified by EPA.

C. On-Scene Coordinator, Other Personnel, and Modifications to EPA-Approved SOP

45. All activities required of Respondent under the terms of this Settlement Agreement shall be performed only by qualified persons possessing all necessary permits, licenses, and other authorizations required by the Federal government and the State of New York, and all work conducted pursuant to this Settlement Agreement shall be performed in accordance with prevailing professional standards.
46. The current EPA OSC for the Site is: Michael Solecki, Response and Prevention Branch, Emergency and Remedial Response Division, U.S. Environmental Protection Agency, Region 2, 2890 Woodbridge Avenue, Building 205 (MS-211), Edison, New Jersey 08837, telephone number (732) 906-6918. EPA will notify Respondent's Project Coordinator if EPA designates a different OSC for this Site.
47. EPA, including the OSC, or his authorized representative, will conduct oversight of the implementation of this Settlement Agreement. The OSC shall have the authority

vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement Agreement, or to direct any other response action undertaken by EPA or Respondent at the Site consistent with this Settlement Agreement. Absence of the OSC from the Site shall not be cause for stoppage of Work unless specifically directed by the OSC.

48. As appropriate during the course of implementation of the actions required of Respondent pursuant to this Settlement Agreement, Respondent or its consultants or contractors, acting through the Project Coordinator, may confer with EPA concerning the required actions. Based upon new circumstances or new information not in the possession of EPA on the Effective Date of this Settlement Agreement, the Project Coordinator may request, in writing, EPA approval of modification(s) to the EPA-approved SOP. Only modifications approved by EPA in writing shall be deemed effective. Upon approval by EPA, such modifications shall be deemed incorporated into this Settlement Agreement and shall be implemented by Respondent.

VII. PLANS AND REPORTS REQUIRING EPA APPROVAL

49. If EPA disapproves or otherwise requires any modifications to any plan, report or other item required to be submitted to EPA for approval pursuant to this Settlement Agreement, Respondent shall have fourteen (14) days from the receipt of notice of such disapproval or the required modifications to correct any deficiencies and resubmit the plan, report, or other written document to EPA for approval, unless a shorter or longer period is specified in the notice. Any notice of disapproval will include an explanation of why the plan, report, or other item is being disapproved. Respondent shall address each of the comments and resubmit the plan, report, or other item with the required changes within the time stated above. At such time as EPA determines that the plan, report, or other item is acceptable, EPA will transmit to Respondent a written statement to that effect.
50. If any plan, report, or other item required to be submitted to EPA for approval pursuant to this Settlement Agreement is disapproved by EPA, even after being resubmitted following Respondent's receipt of EPA's comments on the initial submittal, Respondent shall be deemed to be out of

compliance with this Settlement Agreement. If any resubmitted plan, report, or other item, or portion thereof, is disapproved by EPA, EPA may again direct Respondent to make the necessary modifications thereto, and/or EPA may amend or develop the item(s) and recover the costs of doing so from Respondent. Respondent shall implement any such item(s) as amended or developed by EPA.

51. EPA shall be the final arbiter in any dispute regarding the sufficiency or acceptability of all documents submitted and all activities performed pursuant to this Settlement Agreement. EPA may modify those documents and/or perform additional work unilaterally.
52. All plans, reports and other submittals required to be submitted to EPA pursuant to this Settlement Agreement, upon approval by EPA, shall be deemed to be incorporated into and an enforceable part of this Settlement Agreement.

VIII. REPORTING AND NOTICE TO EPA

53. Commencing on the tenth day of the month after the Effective Date of this Settlement Agreement, unless there is field work at the Site, Respondent shall provide monthly progress reports. Whenever, during the implementation of this Settlement Agreement, Respondent is engaged in active field work, Respondent shall provide EPA with daily oral progress reports, as well as written progress reports every two weeks. The first written progress report during active field work shall be submitted within seven (7) days of the commencement of field work. All progress reports shall fully describe all actions and activities undertaken pursuant to this Settlement Agreement. Such progress reports shall, among other things: (a) describe the actions taken toward achieving compliance with this Settlement Agreement during the previous week; (b) include all results of sampling and tests and all other data received by Respondent after the most recent progress report submitted to EPA; (c) describe all actions which are scheduled for the next week; (d) provide other information relating to the progress of Work as is customary in the industry; and (e) include information regarding estimated percentage of completion, all delays encountered or anticipated that may affect the future schedule for completion of the Work

required hereunder, and a description of all efforts made to mitigate those delays or anticipated delays.

54. Respondent shall provide EPA with at least one (1) week advance notice of any change in the schedule.
55. The Final Report referred to in Paragraph 57, below, and other documents submitted by Respondent to EPA which purport to document Respondent's compliance with the terms of this Settlement Agreement shall be signed by a responsible official of Respondent or by the Project Coordinator designated pursuant to Paragraph 24. For purposes of this paragraph, a responsible official is an official who is in charge of a principal business function.
56. Respondent shall submit copies of the SOP, the Final Report, and any other plans, reports, or other submissions required by this Settlement Agreement as set forth below. Any electronic submissions must be in a format that is compatible with EPA software and in database files and sizes to be specified by EPA. Reports should be submitted to the following:

3 copies:

1 bound, 1 unbound, 1 electronic to:

U.S. Environmental Protection Agency Region 2
2890 Woodbridge Avenue
Building 209 (MS-211)
Edison, New Jersey 08837
Attention: WR Grace Site On-Scene Coordinator
solecki.michael@epa.gov

1 electronic copy:

New York/Caribbean Superfund Branch
Office of Regional Counsel
United States Environmental Protection Agency Region 2
290 Broadway, 17th Floor New York, New York 10007-1866
Attention: Attorney for WR Grace Site
davis.leilani@epa.gov

1 electronic copy:

Environmental Engineer
Section B - Remedial Bureau B
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7016
djfarrar@gw.dec.state.ny.us

57. Within sixty (60) days after completion of the work required by the SOP, Respondent shall submit for EPA review and approval a Final Report summarizing the actions taken to comply with this Settlement Agreement. The Final Report shall include:
- a. A synopsis of all Work performed under this Settlement Agreement;
 - b. A detailed description of all EPA-approved modifications to the SOP which occurred during Respondent's performance of the Work required under this Settlement Agreement;
 - c. A listing of quantities and types of materials removed from the Site or handled on-Site;
 - d. A discussion of removal and disposal options considered for those materials;
 - e. A listing of the ultimate destination of those materials;
 - f. A presentation of the analytical results of all sampling and analyses performed, including QAPP data and chain of custody records;
 - g. Accompanying appendices containing all relevant documentation generated during the Work (e.g. manifests, bills of lading, invoices, bills, contracts, certificates of destruction and permits);
 - h. An accounting of expenses incurred by Respondent in performing the work; and

- i. The following certification signed by a person who supervised or directed the preparation of the Final Report:

"I certify that the information contained in and accompanying this document is true, accurate, and complete."

58. EPA either will approve the Final Report or will require modifications thereto pursuant to Paragraphs 49-52, above.

IX. OVERSIGHT

59. During the implementation of the requirements of this Settlement Agreement, Respondent and its contractor(s) and subcontractors shall be available for such conferences with EPA and inspections by EPA or its authorized representatives as EPA may determine are necessary to adequately oversee the Work being carried out or to be carried out by Respondent, including inspections at the Site and at laboratories where analytical work is being done hereunder.
60. Respondent and its employees, agents, contractor(s) and consultant(s) shall cooperate with EPA in its efforts to oversee Respondent's implementation of this Settlement Agreement.

X. COMMUNITY RELATIONS

61. Respondent shall cooperate with EPA in providing information relating to the Work required hereunder to the public. As requested by EPA, Respondent shall participate in the preparation of all appropriate information disseminated to the public; participate in public meetings which may be held or sponsored by EPA to explain activities at or concerning the Site; and provide a suitable location for public meetings, as needed.

XI. ACCESS TO PROPERTY AND INFORMATION

62. EPA, NYSDEC, and their designated representatives, including, but not limited to, employees, agents, contractor(s), and consultant(s) thereof, shall be permitted to observe the Work carried out pursuant to this Settlement Agreement. Respondent shall at all times permit EPA,

NYSDEC, and its designated representatives full access to and freedom of movement at the Site and any other premises where Work under this Settlement Agreement is to be performed for purposes of inspecting or observing Respondent's progress in implementing the requirements of this Settlement Agreement, verifying the information submitted to EPA by Respondent, conducting investigations relating to contamination at the Site, or for any other purpose EPA determines to be reasonably related to EPA oversight of the implementation of this Settlement Agreement.

63. In the event that action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than Respondent, Respondent shall use its best efforts to obtain access agreements from the present owners within twenty (20) days of the Effective Date of this Settlement Agreement for purposes of implementing the requirements of this Settlement Agreement. Such agreements shall provide access not only for Respondent, but also for EPA and its designated representatives or agents, as well as NYSDEC and its designated representatives or agents. Such agreements shall specify that Respondent is not EPA's representative with respect to liability associated with Site activities. If such access agreements are not obtained by Respondent within the time period specified herein, Respondent shall immediately notify EPA of its failure to obtain access and shall include in that notification a summary of the steps Respondent has taken to attempt to obtain access. Subject to the United States' non-reviewable discretion, EPA may use its legal authorities to obtain access for Respondent, may perform those response actions with EPA contractors at the property in question, or may terminate the Settlement Agreement if Respondent cannot obtain access agreements. If EPA performs those tasks or activities with EPA contractors and does not terminate the Settlement Agreement, Respondent shall perform all other activities not requiring access to that property. Respondent shall integrate the results of any such tasks undertaken by EPA into its reports and deliverables.
64. Upon request, Respondent shall provide EPA with access to all records and documentation related to the conditions at the Site, hazardous substances found at or released from the Site, and the actions conducted pursuant to this Settlement

Agreement except for those items, if any, subject to the attorney-client or attorney work product privileges. Nothing herein shall preclude Respondent from asserting a business confidentiality claim pursuant to 40 C.F.R. Part 2, Subpart B. All data, information, and records created, maintained, or received by Respondent or its contractor(s) or consultant(s) in connection with implementation of the Work under this Settlement Agreement, including, but not limited to, contractual documents, invoices, receipts, work orders, and disposal records shall, without delay, be made available to EPA upon request, subject to the same privileges specified above in this paragraph. EPA shall be permitted to copy all such documents. Respondent shall submit to EPA upon receipt the results of all sampling or tests and all other technical data generated by Respondent or its contractor(s), or on Respondent's behalf, in connection with the implementation of this Settlement Agreement.

65. Upon request by EPA, Respondent shall provide EPA or its designated representatives with duplicate and/or split samples of any material sampled in connection with the implementation of this Settlement Agreement.
66. Notwithstanding any other provision of this Settlement Agreement, EPA hereby retains all of its information gathering, access, and inspection authority under CERCLA, RCRA, and any other applicable statutes or regulations.

XII. RECORD RETENTION, DOCUMENTATION, AVAILABILITY
OF INFORMATION

67. Respondent shall preserve all documents and information relating to Work performed under this Settlement Agreement, or relating to Waste materials found on or released from the Site, for six (6) years after completion of the Work required by this Settlement Agreement. At the end of the six (6) year period, Respondent shall notify EPA at least thirty (30) days before any such document or information is destroyed that such documents and information are available for inspection. Upon request, Respondent shall provide EPA with the originals or copies of such documents and information.

68. All documents submitted by Respondent to EPA in the course of implementing this Settlement Agreement shall be available to the public unless identified as confidential by Respondent pursuant to 40 C.F.R. Part 2, Subpart B, and determined by EPA to merit treatment as confidential business information in accordance with applicable law. In addition, EPA may release all such documents to NYSDEC, and NYSDEC may make those documents available to the public unless Respondent conforms with applicable New York law and regulations regarding confidentiality. Respondent shall not assert a claim of confidentiality regarding any monitoring or hydrogeologic data, any information specified under Section 104(e)(7)(F) of CERCLA, or any other chemical, scientific, or engineering data relating to the Work performed hereunder.

XIII. OFF-SITE SHIPMENTS

69. All hazardous substances and pollutants or contaminants removed from the Site pursuant to this Settlement Agreement for off-Site treatment, storage, or disposal shall be treated, stored, or disposed of in compliance with (a) Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), (b) Section 300.440 of the NCP, (c) the Clean Air Act ("CAA"), 42 U.S.C. § 7401, et seq., (d) RCRA, and (e) all other applicable Federal and State requirements.
70. If hazardous substances from the Site are to be shipped outside of New York, Respondent shall provide prior notification of such Waste shipments in accordance with the EPA Memorandum entitled "Notification of Out-of-State Shipments of Superfund Site Wastes" (OSWER Directive 9330.2-07, September 14, 1989). At least five (5) working days prior to such Waste shipments, Respondent shall notify the environmental agency of the accepting state of the following: (a) the name and location of the facility to which the Wastes are to be shipped; (b) the type and quantity of Waste to be shipped; (c) the expected schedule for the Waste shipments; (d) the method of transportation and name of transporter; and (e) the treatment and/or disposal method of the Waste streams.
71. Before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-Site location, Respondents shall obtain EPA's determination that the

proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondents shall only send hazardous substances, pollutants, or contaminants from the Site to an off-Site facility that complies with the requirements of the statutory provision and regulation cited in the preceding sentence.

XIV. COMPLIANCE WITH OTHER LAWS

72. All actions required pursuant to this Settlement Agreement shall be performed in accordance with all applicable Federal and State laws and regulations except as provided in CERCLA § 121(e)(1), 42 U.S.C. § 9621(e)(1), and 40 C.F.R. § 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-Site actions required pursuant to this Settlement Agreement shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements ("ARARs") under Federal environmental or State environmental or facility siting laws. (See "Superfund Removal Procedures: Guidance on the Consideration of ARARs During Removal Actions," OSWER Directive No. 9360.3-02, August 1991).
73. Except as provided in Section 121(e)(1) of CERCLA, 42 U.S.C. § 9621(e)(1), and the NCP, no permit shall be required for any portion of the Work required hereunder that is conducted entirely on-Site. Where any portion of the Work requires a Federal or State permit or approval, Respondent shall submit timely applications and shall take all other actions necessary to obtain and to comply with all such permits or approvals. This Settlement Agreement is not, nor shall it be construed to be, a permit issued pursuant to any Federal or State statute or regulation.

XV. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

74. Upon the occurrence of any event during performance of the Work required hereunder which, pursuant to Section 103 of CERCLA, 42 U.S.C. § 9603, requires reporting to the National Response Center, telephone number (800) 424-8802, Respondent shall immediately orally notify the Chief of the Response and Prevention Branch of the Emergency and Remedial Response Division of EPA, Region 2, at (732) 321-6656 of the incident

or Site conditions. Respondent shall also submit a written report to EPA within seven (7) days after the onset of such an event, setting forth the events that occurred and the measures taken or to be taken, if any, to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. The reporting requirements of this paragraph are in addition to, not in lieu of, reporting under CERCLA Section 103, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

75. In the event of any action or occurrence during Respondent's performance of the requirements of this Settlement Agreement which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action to prevent, abate, or minimize the threat and shall immediately notify EPA as provided in the preceding paragraph. Respondent shall take such action in accordance with applicable provisions of this Settlement Agreement including, but not limited to, the Site Health and Safety Plan. In the event that EPA determines that: (a) the activities performed pursuant to this Settlement Agreement; (b) significant changes in conditions at the Site; or (c) emergency circumstances occurring at the Site pose a threat to human health or the environment, EPA may direct Respondent to stop further implementation of any actions pursuant to this Settlement Agreement or to take other and further actions reasonably necessary to abate the threat.
76. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

XVI. REIMBURSEMENT OF COSTS

77. Respondent hereby agrees to reimburse EPA for Past Response Costs and Future Response Costs in connection with the Site.
 - a. Within thirty (30) days of the effective date of the Plan, as the term effective date is defined in the Plan,

Respondent shall pay \$234,038.84 for Past Response Costs and Interest on such costs from the Effective Date until the date of payment.

- b. EPA will periodically send billings to Respondent for Future Response Costs. The billings will be accompanied by a printout of cost data in EPA's financial management system. Respondent shall remit all payments to EPA via electronic funds transfer ("EFT") within thirty (30) days of receipt of each such billing or thirty (30) days of the effective date of the Plan, whichever is later.
78. To effect payment via EFT, Respondent shall instruct its bank to remit payment in the required amount via EFT using the following information, or such other updated EFT information that EPA may subsequently provide to Respondent:
- . Amount of payment:
 - . Bank: **Federal Reserve Bank of New York**
 - . Account code for Federal Reserve Bank account receiving the payment: **68010727**
 - . Federal Reserve Bank ABA Routing Number: **021030004**
 - . SWIFT Address: **FRNYUS33**
 - . 33 Liberty Street
 - . New York, NY 10045
 - . Field Tag 4200 of the Fedwire message should read:
D 68010727 Environmental Protection Agency
 - . Name of remitter:
 - . Settlement Agreement Index number: **CERCLA-02-2012-2003**
 - . Site/spill identifier: **02-XM**

At the time of payment, Respondent shall send notice that such payment has been made by email to acctsreceivable.cinwd@epa.gov, rice.richard@epa.gov and to:

U.S. Environmental Protection Agency
Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, OH 45268

and:

Michael Solecki, On-Scene Coordinator
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2

2890 Woodbridge Avenue
Building 205 (MS-211)
Edison, New Jersey 08837

as well as to:

Elizabeth Leilani Davis
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 2
290 Broadway, 17th Floor
New York, New York 10007-1866

Such notice shall reference the date of the EFT, the payment amount, the name of the Site, the Settlement Agreement index number, and Respondent's names and addresses.

79. The total amount to be paid by Respondent pursuant to this Paragraph shall be deposited into the WR Grace Superfund Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.
80. Respondent shall pay Interest on any amounts overdue under Paragraph 77.b. above. Such Interest shall begin to accrue on the first day that payment is overdue and shall continue to accrue until the date of payment.

XVII. FORCE MAJEURE

81. Respondent agrees to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed by a *force majeure*. "Force majeure," for purposes of this Settlement Agreement, is defined as any event arising from causes beyond the control of Respondent and of any entity controlling, controlled by, or under common control with Respondent, including its contractors and subcontractors, that delays the timely performance of any obligation under this Settlement Agreement notwithstanding Respondent's best efforts to avoid the delay. The requirement that Respondent exercise "best efforts to avoid the delay" includes using best efforts to anticipate any potential force majeure event and best efforts to address

the effects of any potential force majeure event: (a) as it is occurring; and (b) following the potential force majeure event, such that the delay is minimized to the greatest extent practicable. Examples of events that are not force majeure events include, but are not limited to, increased costs or expenses of any Work to be performed under this Settlement Agreement or the financial difficulty of Respondent to perform such Work.

82. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a force majeure event, Respondent shall notify by telephone the EPA OSC or, in his absence, the Chief of the Removal Action Branch of the Emergency and Remedial Response Division of EPA Region 2 at 732-321-6658 within forty-eight (48) hours of when Respondent knew or should have known that the event might cause a delay. In addition, Respondent shall notify EPA in writing within seven (7) days after the date when Respondent first becomes aware or should have become aware of the circumstances which may delay or prevent performance. Such written notice shall be accompanied by all available and pertinent documentation, including third-party correspondence, and shall contain the following: (a) a description of the circumstances, and Respondent's rationale for interpreting such circumstances as being beyond its control (should that be Respondent's claim); (b) the actions (including pertinent dates) that Respondent has taken and/or plans to take to minimize any delay; and (c) the date by which or the time period within which Respondent proposes to complete the delayed activities. Such notification shall not relieve Respondent of any of its obligations under this Settlement Agreement. Respondent's failure to timely and properly notify EPA as required by this paragraph shall constitute a waiver of Respondent's right to claim an event of force majeure. The burden of proving that an event constituting a force majeure has occurred shall rest with Respondent.
83. If EPA determines that a delay in performance of a requirement under this Settlement Agreement is or was attributable to a force majeure, the time period for performance of that requirement shall be extended as deemed necessary by EPA. Such an extension shall not alter Respondent's obligation to perform or complete other tasks

required by the Settlement Agreement which are not directly affected by the force majeure. Respondent shall use its best efforts to avoid or minimize any delay or prevention of performance of its obligations under this Settlement Agreement.

XVIII. STIPULATED AND STATUTORY PENALTIES

84. If Respondent fails, without prior EPA approval, to comply with any of the requirements or time limits set forth in or established pursuant to this Settlement Agreement, and such failure is not excused under the terms of Paragraphs 81 through 83 above (Force Majeure), Respondent shall, upon demand by EPA, pay a stipulated penalty to EPA in the amount indicated below:
 - a. For all requirements of this Settlement Agreement, other than the timely provision of progress reports required by Paragraph 53, stipulated penalties shall accrue in the amount of \$1,000 per day, per violation, for the first seven days of noncompliance, \$1,500 per day, per violation, for the 8th through 15th day of noncompliance, \$3,000 per day, per violation, for the 16th through 25th day of noncompliance, and \$5,000 per day, per violation, for the 26th day of noncompliance and beyond.
 - b. For the progress reports required by Paragraph 53, stipulated penalties shall accrue in the amount of \$500 per day, per violation, for the first seven days of noncompliance, \$1,000 per day, per violation, for the 8th through 15th day of noncompliance, \$1,500 per day, per violation, for the 16th through 25th day of noncompliance, and \$2,500 per day, per violation, for the 26th day of noncompliance and beyond.
85. Any such penalty shall accrue as of the first day after the applicable deadline has passed and shall continue to accrue until the noncompliance is corrected or EPA notifies Respondent that it has determined that it will perform the tasks for which there is non-compliance. Such penalty shall be due and payable within thirty (30) days following receipt of a written demand from EPA, or the effective date of the

Plan, whichever is later. Payment of any such penalty to EPA shall be made via EFT in accordance with the payment procedures in Paragraph 77 above. Respondent shall pay Interest on any amounts overdue under this paragraph. Such Interest shall begin to accrue on the first day that the respective payment is overdue.

86. Even if violations are simultaneous, separate penalties shall accrue for separate violations of this Settlement Agreement. Penalties accrue and are assessed per violation per day. Penalties shall accrue regardless of whether EPA has notified Respondent of a violation or act of noncompliance. The payment of penalties shall not alter in any way Respondent's obligation to complete the performance of the Work required under this Settlement Agreement.
87. Notwithstanding any other provision of this Settlement Agreement, failure of Respondent to comply with any provision of this Settlement Agreement may subject Respondent to civil penalties of up to thirty-seven thousand five hundred dollars (\$37,500) per violation per day, as provided in Sections 109 and 122(1) of CERCLA, 42 U.S.C. §§ 9609 and 9622(1), and the Debt Collection and Improvement Act of 1996 (see Civil Monetary Penalty Inflation Adjustment Rule, 74 Fed. Reg. 626 (January 7, 2009)), unless such failure to comply is excused by EPA under the terms of Paragraphs 81 through 83 above. Respondent may also be subject to punitive damages in an amount at least equal to but not more than three times the amount of any costs incurred by the United States as a result of such failure to comply with this Settlement Agreement, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Should Respondent violate this Settlement Agreement or any portion thereof, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Settlement Agreement pursuant to Sections 106 and 122 of CERCLA, 42 U.S.C. §§ 9606 and 9622.

XIX. OTHER CLAIMS

88. By issuance of this Settlement Agreement, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent or Respondent's employees, agents, contractors,

or consultants in carrying out any action or activity pursuant to this Settlement Agreement. The United States or EPA shall not be held out as or deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.

89. Except as expressly provided in Section XXII (Covenant Not to Sue by EPA), below, nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Respondent or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.
90. No action or decision by EPA pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XX. INDEMNIFICATION

91. Respondent agrees to indemnify, save, and hold harmless the United States, its agencies, departments, officials, agents, contractors, subcontractors, employees, and representatives from any and all claims or causes of action arising from or on account of acts or omissions of Respondent, its employees, officers, directors, agents, servants, receivers, trustees, successors, assigns, or any other persons acting on behalf of Respondent or under its control, as a result of the fulfillment or attempted fulfillment of the terms and conditions of this Settlement Agreement by Respondent.
92. Respondent waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondent shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement

arising from or on account of any contract, agreement, or arrangement between Respondent and any person for performance of Work on or relating to the Site, including but not limited to, claims on account of construction delays.

93. Further, Respondent agrees to pay the United States all costs it incurs including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Settlement Agreement.

XXI. INSURANCE

94. At least seven (7) days prior to commencing any Work at the Site, Respondent shall submit to EPA a certification that Respondent or its contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondent pursuant to this Settlement Agreement. Respondent shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Settlement Agreement.

XXII. COVENANT NOT TO SUE BY EPA

95. In consideration of the actions that will be performed and the payments that will be made by Respondent under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for performance of the Work and for recovery of Past Response Costs and Future Response Costs. This covenant not to sue shall take effect upon the Effective Date of this Settlement Agreement and is conditioned upon the complete and satisfactory performance by Respondent of all its obligations under this Settlement Agreement, including, but not limited to, payment of Past Response Costs and Future Response Costs pursuant to Section

XVI (Reimbursement of Costs), above. This covenant not to sue extends only to Respondent and does not extend to any other person.

XXIII. RESERVATION OF RIGHTS BY EPA

96. Except as specifically provided in this Settlement Agreement, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.
97. The covenant not to sue set forth in Section XXII (Covenant Not to Sue by EPA), above, does not pertain to any matters other than those expressly identified therein. EPA reserves, and this Settlement Agreement is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:
 - a. claims based on a failure by Respondent to meet a requirement of this Settlement Agreement;
 - b. liability for costs not included within the definition of Past Response Costs and Future Response Costs;
 - c. liability for performance of response action other than the Work;
 - d. criminal liability;
 - e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

- f. liability arising from the past, present, or future disposal, release or threat of release of Waste outside of the Site; and
 - g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.
98. Work Takeover. In the event EPA determines that Respondent has ceased implementation of any portion of the Work, is seriously or repeatedly deficient or late in its performance of the Work, or is implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA may assume the performance of all or any portion of the Work as EPA determines necessary. Costs incurred by the United States in performing the Work pursuant to this paragraph shall be considered Future Response Costs that Respondent shall pay pursuant to Section XVI (Reimbursement of Costs). Notwithstanding any other provision of this Settlement Agreement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XXIV. COVENANT NOT TO SUE BY RESPONDENT

99. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, Past Response Costs, Future Response Costs, or this Settlement Agreement, including, but not limited to:
- a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;
 - b. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the New York State Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

- c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Site.

These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 97 (b), (c), and (e)-(g), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

100. Nothing in this Settlement Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXV. CONTRIBUTION PROTECTION AND RIGHTS

101. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(2) of CERCLA, 42 U.S.C. § 9613(f)(2), and that Respondent is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), for "matters addressed" in this Settlement Agreement. The "matters addressed" in this Settlement Agreement are the Work, Past Response Costs, and Future Response Costs.
102. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B), pursuant to which Respondent has resolved its liability to the United States for the Work performed under this Settlement Agreement, for Past Response Costs and for Future Response Costs.

Except as provided in Section XXIV (Covenant Not to Sue by Respondent), above, nothing in this Settlement Agreement precludes the United States or Respondent from asserting any claims, causes of action or demands against any persons not parties to this Settlement Agreement for indemnification, contribution or cost recovery. Nothing herein diminishes the right of the United States, pursuant

to Sections 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that provide contribution protection to such persons.

XXVI. MODIFICATIONS

103. The OSC may make modifications to any plan or schedule in writing or by oral direction. Any oral modification will be memorialized in writing by EPA promptly, but shall have as its effective date the date of the OSC's oral direction. Any other requirements of this Settlement Agreement may be modified in writing by mutual agreement of the Parties.
104. If Respondent seeks permission to deviate from any approved work plan or schedule, Respondent's Project Coordinator shall submit a written request to EPA for approval outlining the proposed modification and its basis. Respondent may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to Paragraph 105.
105. No informal advice, guidance, suggestion, or comment by the OSC or other EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXVII. ADDITIONAL REMOVAL ACTION

106. Notwithstanding any other provision of this Settlement Agreement, if EPA determines that additional removal actions not included in any plan approved hereunder are necessary under applicable law to protect public health, welfare, or the environment, EPA will notify Respondent of that determination. If Respondent agrees with such determination, within thirty (30) days of receipt of notice from EPA that additional removal actions are necessary to protect public health, welfare, or the environment, Respondent shall submit for approval by EPA an appropriate revision to the SOP for the additional removal actions. The SOP shall conform to the applicable requirements of

Section VI (Work to Be Performed) of this Settlement Agreement. Upon EPA's approval of the SOP pursuant to Section VI, Respondent shall implement the SOP for additional removal actions in accordance with the provisions and schedule contained therein. This Section does not alter or diminish the OSC's authority to make oral modifications to any plan or schedule pursuant to Section XXVI (Modifications). If Respondent does not agree with EPA's determination, then EPA and Respondent may enter into a separate agreement and order for performance of additional removal actions.

XXVIII. TERMINATION AND SATISFACTION

107. Upon a determination by EPA (following its receipt of the Final Report referred to in Paragraph 57, above) that the Work required pursuant to this Settlement Agreement has been fully carried out in accordance with this Settlement Agreement, EPA will so notify Respondent in writing. Such notification shall not affect any continuing obligations of Respondent. If EPA determines that any removal activities have not been completed in accordance with this Settlement Agreement, EPA may so notify Respondent, provide a list of the deficiencies, and require that Respondent corrects such deficiencies.

XXIX. SEVERABILITY/INTEGRATION/APPENDICES

108. If a court issues an order that invalidates any provision of this Settlement Agreement or finds that Respondent has sufficient cause not to comply with one or more provisions of this Settlement Agreement, Respondent shall remain bound to comply with all provisions of this Settlement Agreement not invalidated or determined to be subject to a sufficient cause defense by the court's order.
109. This Settlement Agreement and its appendices constitute the final, complete and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The Parties acknowledge that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Settlement Agreement. The following appendices are attached to and incorporated into this Settlement Agreement:

Appendix A -Map of Site
Appendix B -Cost Summary dated 03/29/2012
Appendix C -Cost Estimate for the Work to be Performed
Appendix D -"Standard Operating Procedures of CARB 435 Analysis"

XXX. EFFECTIVE DATE

110. In order to receive authority to carry out its obligations under this Settlement Agreement including, but not limited to, carrying out the Work to be performed, Respondent shall file a motion for approval of this Settlement Agreement with the Bankruptcy Court within fourteen (14) days after signature by the Parties. Such motion for approval shall include a request for permission to perform the Work obligations under this Settlement Agreement, as well as allowance by Respondent to pay, as an unsecured, pre-petition, non-priority claim against Respondent's Chapter 11 estate, EPA's Past Response Costs and any other payments due under or made pursuant to this Settlement Agreement. This Settlement Agreement shall not be effective and binding on Respondent unless and until the Bankruptcy Court enters an Order approving this Settlement Agreement.
111. This Settlement Agreement shall become effective five (5) days after the Bankruptcy Court enters an order approving this Settlement. All times for performance of actions or activities required herein will be calculated from said Effective Date.

U.S. ENVIRONMENTAL PROTECTION AGENCY

for *John J. Potula*
Walter E. Mugdan
Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region 2

July 20, 2012
Date

In the Matter of the WR Grace Site, EPA Index No. CERCLA-02-2012-2003

CONSENT

The Respondent named below has had an opportunity to confer with EPA to discuss the terms and the issuance of this Settlement Agreement. Subject to the Bankruptcy Court's entry of an order approving this Settlement Agreement, the Respondent hereby consents to the issuance of this Settlement Agreement and to its terms. Furthermore, the individual signing this Settlement Agreement on behalf of Respondent certifies that he or she is fully and legally authorized to agree to the terms and conditions of this Settlement Agreement and to bind Respondent.

W. R. Grace & Co.
(Name of Respondent)

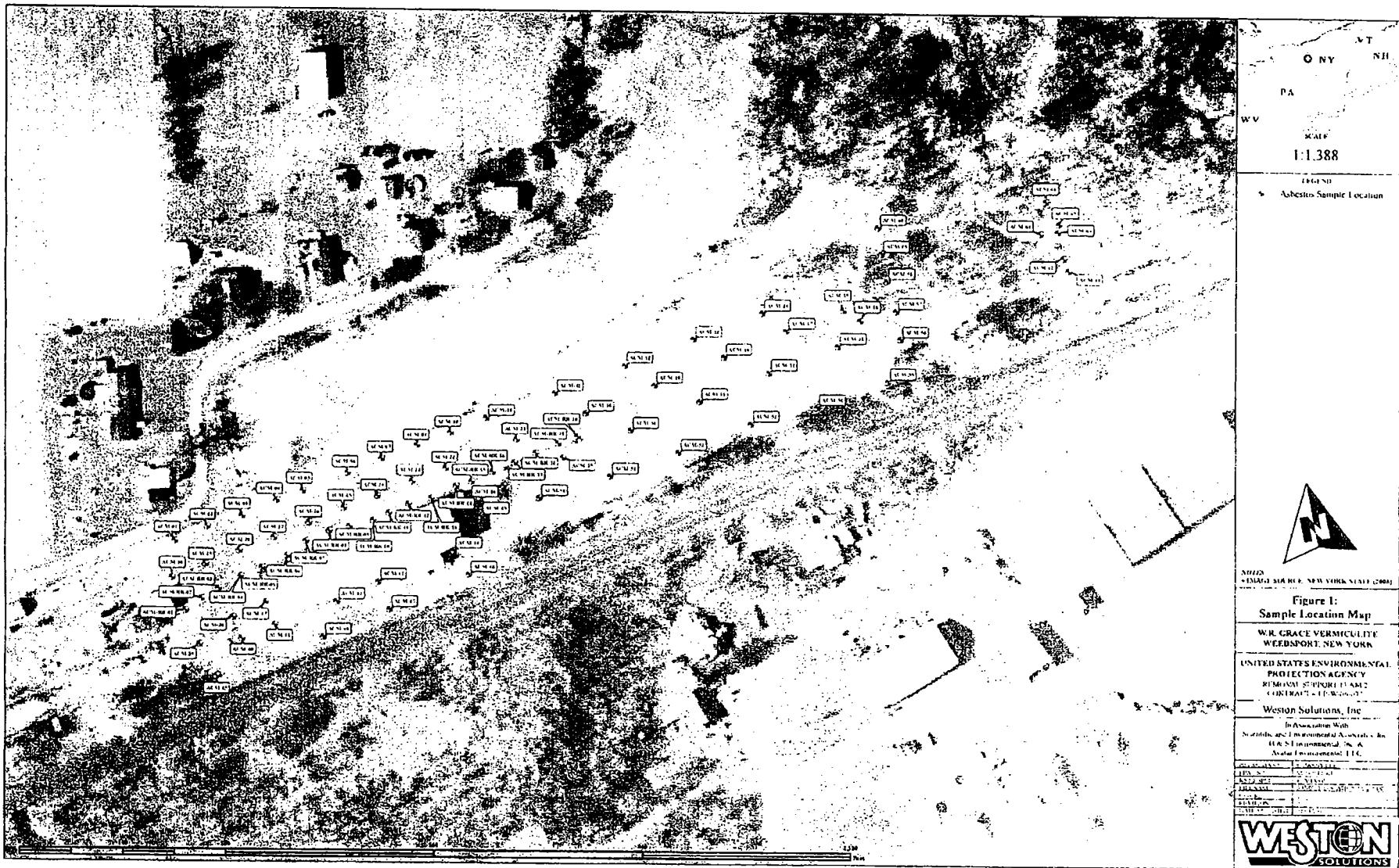
Karen E. Ethier
(Signature)

7/20/2012
(Date)

KAREN E ETHIER
(Printed Name of Signatory)

VICE PRESIDENT ENV. HEALTH + SAFETY
(Title of Signatory)

APPENDIX A



APPENDIX B

APPENDIX B

Report Date: 03/29/2012

Page 1 of 1

Certified By Financial Management Office

Table of Contents

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

NARRATIVE COST SUMMARY	Section 1
ITEMIZED COST SUMMARY	Section 2
REGIONAL PAYROLL COSTS	Section 3
HEADQUARTERS PAYROLL COSTS	Section 4
REGIONAL TRAVEL COSTS	Section 5
HEADQUARTERS TRAVEL COSTS	Section 6
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EMSL)	
LOCKHEED MARTIN (EPD05088)	Section 7
OTHER EXPENDITURES (OTH)	
LOCKHEED MARTIN SERVICES (EPW09031)	Section 8
SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM	
ROY F WESTON, INC. (68-W0-0113)	Section 9
SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3	
WESTON SOLUTIONS (EPW06072)	Section 10
MISCELLANEOUS (MIS) COSTS	
EPA INDIRECT COSTS SUMMARY	
EPA INDIRECT COSTS	Section 13

Report Date: 03/29/2012

Section 1 - Page 1 of 1

Certified By Financial Management Office

Narrative Cost Summary

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

1. The United States Environmental Protection Agency has incurred at least \$44,112.16 for Regional Payroll Costs.
2. The United States Environmental Protection Agency has incurred at least \$3,629.74 for Headquarters Payroll Costs.
3. The United States Environmental Protection Agency has incurred at least \$3,340.16 for Regional Travel Costs.
4. The United States Environmental Protection Agency has incurred at least \$1,174.36 for Headquarters Travel Costs.
5. The United States Environmental Protection Agency has incurred costs of at least \$6,039.92 for ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EMSL) contract expenditures. The total represents the amount spent under the LOCKHEED MARTIN contract.
6. The United States Environmental Protection Agency has incurred costs of at least \$10,853.43 for OTHER EXPENDITURES (OTH) contract expenditures. The total represents the amount spent under the LOCKHEED MARTIN SERVICES contract.
7. The United States Environmental Protection Agency has incurred costs of at least \$31,786.69 for SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM contract expenditures. The total represents the amount spent under the ROY F WESTON, INC. contract.
8. The United States Environmental Protection Agency has incurred costs of at least \$82,104.45 for SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3 contract expenditures. The total represents the amount spent under the WESTON SOLUTIONS contract.
9. The United States Environmental Protection Agency has incurred costs of at least \$48.61 for Miscellaneous Expenses.
10. The United States Environmental Protection Agency has incurred at least \$50,949.32 for Indirect Costs.

Total Site Costs:	\$234,038.84
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Report Date: 03/29/2012

Section 2 - Page 1 of 1

Certified By Financial Management Office

Itemized Cost Summary

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

REGIONAL PAYROLL COSTS	\$44,112.16
HEADQUARTERS PAYROLL COSTS	\$3,629.74
REGIONAL TRAVEL COSTS	\$3,340.16
HEADQUARTERS TRAVEL COSTS	\$1,174.36
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EMSL)	
LOCKHEED MARTIN (EPD05088)	\$6,039.92
OTHER EXPENDITURES (OTH)	
LOCKHEED MARTIN SERVICES (EPW09031)	\$10,853.43
SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM	
ROY F WESTON, INC. (68-W0-0113)	\$31,786.69
SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3	
WESTON SOLUTIONS (EPW06072)	\$82,104.45
MISCELLANEOUS COSTS (MIS)	\$48.61
EPA INDIRECT COSTS	\$50,949.32
Total Site Costs:	\$234,038.84

Report Date: 03/29/2012

Section 3 - Page 1 of 3

Certified By Financial Management Office

Regional Payroll Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Hours</u>	<u>Payroll Costs</u>
BERNS, CAROL Y.	2012	03	2.00	170.78
			2.00	\$170.78
BRANDON-BAZILE, KIM	2011	02	0.25	17.62
			0.25	\$17.62
CAPON, VIRGINIA F.	2011	17	2.68	268.58
		21	0.50	47.49
		24	6.00	569.86
			9.18	\$885.93
CHONG, MARGARET	2006	20	29.50	1,913.05
			29.50	\$1,913.05
COAKLEY, ROY W.	2008	08	2.00	123.71
	2010	16	1.00	67.64
			3.00	\$191.35
DAVIS, ELIZABETH	2010	16	16.25	1,284.79
		17	2.00	158.13
		18	24.50	1,937.08
		19	28.50	2,253.33
		20	14.75	1,166.20
		21	10.75	849.95
		22	0.25	20.05
	2011	04	2.50	188.91
		07	0.50	39.67
		12	3.50	278.14
		14	3.75	298.01
		15	1.25	99.33
		16	10.25	814.54
		17	31.00	2,463.51
		18	19.00	1,551.08
		19	7.00	571.45
		20	0.75	61.22
		21	18.75	1,530.65
		22	10.00	820.65
		23	16.25	1,326.57

Report Date: 03/29/2012

Section 3 - Page 2 of 3

Certified By Financial Management Office

Regional Payroll Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Hours</u>	<u>Payroll Costs</u>
DAVIS, ELIZABETH	2011	24	20.25	1,653.12
		25	4.50	367.36
		26	4.25	346.95
		27	1.25	101.79
		02	1.50	119.22
	2012	03	13.50	1,051.12
		04	2.50	194.65
		05	1.00	77.86
			270.25	\$21,625.33
HARKAY, JAMES D.	2010	12	3.00	232.55
			3.00	\$232.55
LEUNG, CHRISTINA	2010	25	36.00	1,942.33
		26	69.00	3,659.18
	2011	01	4.00	214.53
		02	20.00	1,083.28
		03	62.00	3,284.81
		04	7.00	377.28
		18	4.00	218.00
			202.00	\$10,779.41
MUGDAN, WALTER E.	2010	12	0.50	49.01
			0.50	\$49.01
ROTOLA, JOSEPH D.	2011	20	2.00	194.99
			2.00	\$194.99
SHERIDAN, PATRICIA A.	2010	25	5.00	356.44
		26	5.50	392.10
			10.50	\$748.54
SOLECKI, MICHAEL F.	2010	26	54.00	3,214.26
			54.00	\$3,214.26
TRUONO-WIGGETT, MARISSA	2010	14	1.00	65.81
		16	15.50	1,020.02
		17	2.00	131.61
		18	1.50	98.73

Report Date: 03/29/2012

Section 3 - Page 3 of 3

Certified By Financial Management Office

Regional Payroll Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Hours</u>	<u>Payroll Costs</u>
TRUONO-WIGGETT, MARISSA	2010	19	1.00	67.64
	2011	03	2.00	135.81
		12	3.50	237.67
		17	2.50	169.76
	2012	03	1.00	68.02
			30.00	\$1,995.07
WALL, STEVEN	2011	02	14.00	725.96
			14.00	\$725.96
WILSON, ERIC	2010	12	1.00	76.33
	2011	18	1.00	78.77
		25	9.00	728.68
		26	1.00	80.97
	2012	02	2.00	162.18
		03	3.00	241.38
			17.00	\$1,368.31
Total Regional Payroll Costs			647.18	\$44,112.16

Report Date: 03/29/2012

Section 4 - Page 1 of 1

Certified By Financial Management Office

Headquarters Payroll Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Hours</u>	<u>Payroll Costs</u>
PRINCE, GEORGE R.	2011	03	44.00	3,629.74
			44.00	\$3,629.74
Total Headquarters Payroll Costs			44.00	\$3,629.74

Report Date: 03/29/2012

Section 5 - Page 1 of 1

Certified By Financial Management Office
 Regional Travel Costs
 W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM
 All costs through 12/31/2011

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>
CHONG, MARGARET	TM0436468	06178	06/29/2006	217.50
				\$217.50
DALOIA, JAMES J.	0QLKIP	10161	06/14/2010	273.11
	0QZ5IY	10272	10/01/2010	285.51
	0R2ZC5	10320	11/18/2010	416.50
				\$975.12
DAVIS, ELIZABETH	0QLU3B	10172	06/23/2010	194.50
				\$194.50
LEUNG, CHRISTINA	0R2QD9	10363	01/03/2011	557.00
				\$557.00
NACE, CHARLES G., JR.	0QLBDQ	10180	07/01/2010	200.50
				\$200.50
SOLECKI, MICHAEL F.	0R07EA	10313	11/12/2010	451.69
				\$451.69
SOLECKI, MICHAEL F.	0QLSGW	10167	06/18/2010	224.11
	0QX0IV	10294	10/25/2010	519.74
				\$743.85
Total Regional Travel Costs				\$3,340.16

Report Date: 03/29/2012

Section 6 - Page 1 of 1

Certified By Financial Management Office

Headquarters Travel Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>
PRINCE, GEORGE R.	0R1J1J	10327	11/26/2010	1,174.36
				\$1,174.36
Total Headquarters Travel Costs				\$1,174.36

Report Date: 03/29/2012

Section 7 - Page 1 of 2

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EMSL)

Contractor Name: LOCKHEED MARTIN

EPA Contract Number: EPD05088

Project Officer(s): JOHNSON, KIMBERLEY

Dates of Service: From: 03/22/2010 To: 09/11/2010

Summary of Service: REMOTE SENSING SUPPORT/EPIC(REDI)

Total Costs: \$6,039.92

Voucher Number	Voucher Date	Voucher Amount	Treasury Schedule Number and Date	Site Amount	Annual Allocation
74	04/20/2010	87,667.93	10705 05/21/2010	533.98	9.17
75	05/23/2010	108,158.31	00816 06/25/2010	2,754.42	47.30
76	06/20/2010	87,015.46	00938 08/03/2010	818.07	14.05
77	07/19/2010	111,662.65	00991 08/18/2010	754.13	12.95
78	08/23/2010	127,555.30	00A96 09/17/2010	603.19	10.36
79	09/20/2010	146,965.72	01055 10/19/2010	474.16	8.14
Total:				\$5,937.95	\$101.97

Report Date: 03/29/2012

Section 7 - Page 2 of 2

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY (EMSL)

Contractor Name: LOCKHEED MARTIN

EPA Contract Number: EPD05088

Project Officer(s): JOHNSON, KIMBERLEY

Dates of Service: From: 03/22/2010 To: 09/11/2010

Summary of Service: REMOTE SENSING SUPPORT/EPIC(REDI)

Total Costs: \$6,039.92

<u>Voucher Number</u>	<u>Schedule Number</u>	<u>Rate Type</u>	<u>Annual Allocation Rate</u>
74	10705	Provisional	0.017173
75	00816	Provisional	0.017173
76	00938	Provisional	0.017173
77	00991	Provisional	0.017173
78	00A96	Provisional	0.017173
79	01055	Provisional	0.017173

Report Date: 03/29/2012

Section 8 - Page 1 of 1

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

OTHER EXPENDITURES (OTH)

Contractor Name: LOCKHEED MARTIN SERVICES

EPA Contract Number: EPW09031

Project Officer(s): BURCHETTE, SELLA
UR, NANCY

Dates of Service: From: 11/14/2010 To: 05/22/2011

Summary of Service: SCIENTIFIC,ENGINEERING,RESPONSE,ANALYTIC

Total Costs: \$10,853.43

Voucher Number	Voucher Date	Voucher Amount	Treasury Schedule Number and Date	Site Amount
BVN0013	11/18/2010	1,045,931.82	01264 12/27/2010	6,401.13
BVN0014	01/03/2011	1,121,272.44	11374 01/28/2011	10,274.94
BVN0014	01/03/2011	1,121,272.44	01374 01/28/2011	-6,401.13
BVN0015	01/28/2011	1,984,673.55	11472 02/25/2011	552.04
BVN0019	05/25/2011	1,534,469.69	11883 06/21/2011	26.45
Total:				\$10,853.43

Report Date: 03/29/2012

Section 9 - Page 1 of 2

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM

Contractor Name: ROY F WESTON, INC.

EPA Contract Number: 68-W0-0113

Project Officer(s): ENG, HELEN

Dates of Service: From: 03/01/2006 To: 06/30/2006

Summary of Service: S/F TECH ASSESSMENT&RESPONSE TEAM (REDI)

Total Costs: \$31,786.69

Voucher Number	Voucher Date	Voucher Amount	Treasury Schedule Number and Date	Site Amount	Annual Allocation
82-LOT0011	04/14/2006	239,344.81	06445 05/12/2006	943.48	273.87
84-LOT0011	05/19/2006	187,595.45	06513 06/14/2006	244.97	71.11
88-LOT0011	07/24/2006	222,824.49	06654 08/18/2006	16,388.14	4,757.10
88-LOT0012	07/24/2006	50,125.98	06654 08/18/2006	611.48	177.50
97-LOT0012	11/07/2007	23,323.68	08457 12/06/2007	6,406.60	1,859.69
Z-LOT0012	05/29/2008	1,080.03	08E22 06/24/2008	40.88	11.87
Total:				\$24,635.55	\$7,151.14

Report Date: 03/29/2012

Section 9 - Page 2 of 2

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM

Contractor Name: ROY F WESTON, INC.
 EPA Contract Number: 68-W0-0113
 Project Officer(s): ENG, HELEN
 Dates of Service: From: 03/01/2006 To: 06/30/2006
 Summary of Service: S/F TECH ASSESSMENT&RESPONSE TEAM (REDI)
 Total Costs: \$31,786.69

<u>Voucher Number</u>	<u>Schedule Number</u>	<u>Rate Type</u>	<u>Annual Allocation Rate</u>
82-LOT0011	06445	Class	0.290277
84-LOT0011	06513	Class	0.290277
88-LOT0011	06654	Class	0.290277
88-LOT0012	06654	Class	0.290277
97-LOT0012	08457	Class	0.290277
Z-LOT0012	08E22	Class	0.290277

Report Date: 03/29/2012

Section 10 - Page 1 of 3

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3

Contractor Name: WESTON SOLUTIONS

EPA Contract Number: EPW06072

Delivery Order Information	<u>DO #</u>	<u>Start Date</u>	<u>End Date</u>
	1	08/01/2006	06/30/2007
	17	09/30/2010	06/30/2011
	21	10/01/2010	12/31/2010
	22	01/01/2011	01/31/2011

Project Officer(s): ENG, HELEN

Dates of Service: From: 08/01/2006 To: 06/30/2011

Summary of Service: S/F TECH ASSESSMENT&RESPONSE TEAM (REDI)

Total Costs: \$82,104.45

Voucher Number	Voucher Date	Voucher Amount	Treasury Schedule Number and Date	Site Amount	Annual Allocation
2-LOT0001	09/19/2006	223,615.08	07A35 10/16/2006	2,169.15	292.86
5-LOT0001	10/18/2006	213,871.89	07B05 11/15/2006	1,726.52	233.10
9-LOT0001	11/28/2006	223,615.08	07C03 12/28/2006	386.89	52.23
13-LOT0001	12/13/2006	223,615.08	07C34 01/10/2007	256.97	34.69
15-LOT0001	01/16/2007	246,660.05	07D04 02/13/2007	997.21	134.64
15-LOT0002	01/16/2007	34,249.83	07D04 02/13/2007	4,305.00	581.23
18-LOT0001	02/08/2007	223,615.08	07D45 03/07/2007	294.23	39.72
21-LOT0001	03/09/2007	223,615.08	07E10 04/04/2007	286.85	38.73
43-LOT0002	09/12/2007	18,843.26	08149 10/10/2007	-911.05	-123.00
138-LOT0001	10/14/2010	281,851.50	01111 11/09/2010	10,428.28	1,407.94
138-LOT0002	10/14/2010	84,718.23	01111 11/09/2010	853.71	115.26
140-LOT0001	11/15/2010	241,471.60	01222 12/14/2010	10,904.69	1,472.26
140-LOT0002	11/15/2010	46,127.32	01222 12/14/2010	1,802.59	243.37
147-LOT0002	12/10/2010	6,215.43	11296 01/05/2011	6,215.43	839.16
149-LOT0001	12/15/2010	255,004.55	01322 01/13/2011	2,802.90	378.43
149-LOT0002	12/15/2010	78,220.78	01322 01/13/2011	9,837.86	1,328.22
155-LOT0001	01/14/2011	299,207.73	01418 02/11/2011	1,454.81	196.42
155-LOT0002	01/14/2011	146,730.16	01418 02/11/2011	12,052.95	1,627.29
162-LOT0002	01/14/2011	578.90	11418 02/11/2011	578.90	78.16
163-LOT0001	02/11/2011	244,049.30	01503 03/09/2011	880.21	118.84
166-LOT0002	02/11/2011	20,497.21	01503 03/09/2011	4,594.48	620.31

Report Date: 03/29/2012

Section 10 - Page 2 of 3

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3

Contractor Name: WESTON SOLUTIONS

EPA Contract Number: EPW06072

Delivery Order Information	<u>DO #</u>	<u>Start Date</u>	<u>End Date</u>
	1	08/01/2006	06/30/2007
	17	09/30/2010	06/30/2011
	21	10/01/2010	12/31/2010
	22	01/01/2011	01/31/2011

Project Officer(s): ENG, HELEN

Dates of Service: From: 08/01/2006 To: 06/30/2011

Summary of Service: S/F TECH ASSESSMENT&RESPONSE TEAM (REDI)

Total Costs: \$82,104.45

Voucher Number	Voucher Date	Voucher Amount	Treasury Schedule Number and Date	Site Amount	Annual Allocation
185-LOT0001	07/18/2011	256,140.85	01A65 08/12/2011	419.39	56.62
Total:				\$72,337.97	\$9,766.48

Report Date: 03/29/2012

Section 10 - Page 3 of 3

Certified By Financial Management Office

Contract Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

SUPERFUND TECH ASSESSMENT AND RESPONSE TEAM - 3

Contractor Name: WESTON SOLUTIONS

EPA Contract Number: EPW06072

Delivery Order Information	<u>DO #</u>	<u>Start Date</u>	<u>End Date</u>
	1	08/01/2006	06/30/2007
	17	09/30/2010	06/30/2011
	21	10/01/2010	12/31/2010
	22	01/01/2011	01/31/2011

Project Officer(s): ENG, HELEN

Dates of Service: From: 08/01/2006 To: 06/30/2011

Summary of Service: S/F TECH ASSESSMENT&RESPONSE TEAM (REDI)

Total Costs: \$82,104.45

<u>Voucher Number</u>	<u>Schedule Number</u>	<u>Rate Type</u>	<u>Annual Allocation Rate</u>
2-LOT0001	07A35	Class	0.135012
5-LOT0001	07B05	Class	0.135012
9-LOT0001	07C03	Class	0.135012
13-LOT0001	07C34	Class	0.135012
15-LOT0001	07D04	Class	0.135012
15-LOT0002	07D04	Class	0.135012
18-LOT0001	07D45	Class	0.135012
21-LOT0001	07E10	Class	0.135012
43-LOT0002	08149	Class	0.135012
138-LOT0001	01111	Class	0.135012
138-LOT0002	01111	Class	0.135012
140-LOT0001	01222	Class	0.135012
140-LOT0002	01222	Class	0.135012
147-LOT0002	11296	Class	0.135012
149-LOT0001	01322	Class	0.135012
149-LOT0002	01322	Class	0.135012
155-LOT0001	01418	Class	0.135012
155-LOT0002	01418	Class	0.135012
162-LOT0002	11418	Class	0.135012
163-LOT0001	01503	Class	0.135012
166-LOT0002	01503	Class	0.135012
185-LOT0001	01A65	Class	0.135012

Report Date: 03/29/2012

Page 1 of 1

Certified By Financial Management Office

Financial Cost Summary for the Contract Lab Program

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

CONTRACT LAB PROGRAM (CLP) COSTS

Report Date: 03/29/2012

Section 11 - Page 1 of 1

Certified By Financial Management Office

Miscellaneous (MIS) Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

Miscellaneous (MIS) Costs

Total Costs: \$48.61

<u>Procurement Number</u>	<u>Voucher Number</u>	<u>Voucher Date</u>	<u>Voucher Amount</u>	<u>Treasury Schedule Number and Date</u>	<u>Site Amount</u>	<u>Description</u>
WEST GOVERNMENT SERVICES						
EP102000018	2200019415	06/22/2010	124.39	K2631	06/22/2010	48.61
			Vendor Total:			\$48.61
			Total Miscellaneous Costs:			\$48.61

Report Date: 03/29/2012

Section 12 - Page 1 of 1

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

<u>Fiscal Year</u>	<u>Direct Costs</u>	<u>Indirect Rate(%)</u>	<u>Indirect Costs</u>
2006	25,598.20	31.00%	7,935.44
2007	11,830.02	31.33%	3,706.36
2008	7,408.70	34.74%	2,573.79
2010	25,541.63	26.57%	6,786.42
2011	110,625.76	26.57%	29,393.27
2012	2,085.21	26.57%	554.04
	<u><u>183,089.52</u></u>		
Total EPA Indirect Costs			\$50,949.32

Report Date: 03/29/2012

Section 13 - Page 1 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
CHONG, MARGARET	2006	20	1,913.05	31.00%	593.05
			1,913.05		\$593.05

Total Fiscal Year 2006 Payroll Direct Costs:	1,913.05	\$593.05
	<u>1,913.05</u>	<u>\$593.05</u>

TRAVEL DIRECT COSTS

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
CHONG, MARGARET	TM0436468	06/29/2006	217.50	31.00%	67.43
			217.50		\$67.43

Total Fiscal Year 2006 Travel Direct Costs:	217.50	\$67.43
	<u>217.50</u>	<u>\$67.43</u>

OTHER DIRECT COSTS

<u>Contract, IAG, SCA, Misc.NO</u>	<u>Voucher Number</u>	<u>Treasury Schedule Date</u>	<u>Site Amount</u>	<u>Annual/SMO Allocation Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
68-W0-0113	82-LOT0011	05/12/2006	943.48	273.87	31.00%	377.38
	84-LOT0011	06/14/2006	244.97	71.11	31.00%	97.98
	88-LOT0012	08/18/2006	611.48	177.50	31.00%	244.58
	88-LOT0011	08/18/2006	16,388.14	4,757.10	31.00%	6,555.02
			18,188.07	5,279.58		\$7,274.96

Total Fiscal Year 2006 Other Direct Costs:	18,188.07	5,279.58	\$7,274.96
	<u>18,188.07</u>	<u>5,279.58</u>	<u>\$7,274.96</u>

Total Fiscal Year 2006:	25,598.20	\$7,935.44
	<u>25,598.20</u>	<u>\$7,935.44</u>

Report Date: 03/29/2012

Section 13 - Page 2 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

OTHER DIRECT COSTS

Contract, IAG, SCA, Misc.NO	Voucher Number	Treasury Schedule Date	Site Amount	Annual/SMO Allocation Costs	Ind. Rate (%)	Indirect Costs
EPW06072	2-LOT0001	10/16/2006	2,169.15	292.86	31.33%	771.35
	5-LOT0001	11/15/2006	1,726.52	233.10	31.33%	613.95
	9-LOT0001	12/28/2006	386.89	52.23	31.33%	137.58
	13-LOT0001	01/10/2007	256.97	34.69	31.33%	91.38
	15-LOT0002	02/13/2007	4,305.00	581.23	31.33%	1,530.86
	15-LOT0001	02/13/2007	997.21	134.64	31.33%	354.61
	18-LOT0001	03/07/2007	294.23	39.72	31.33%	104.63
	21-LOT0001	04/04/2007	286.85	38.73	31.33%	102.00
			10,422.82	1,407.20		\$3,706.36
Total Fiscal Year 2007 Other Direct Costs:			<u>10,422.82</u>	<u>1,407.20</u>		<u>\$3,706.36</u>
Total Fiscal Year 2007:			<u>11,830.02</u>			<u>\$3,706.36</u>

PAYROLL DIRECT COSTS

Employee Name	Fiscal Year	Pay Period	Payroll Costs	Ind. Rate (%)	Indirect Costs
COAKLEY, ROY W.	2008	08	123.71	34.74%	42.98
			<u>123.71</u>		<u>\$42.98</u>
Total Fiscal Year 2008 Payroll Direct Costs:			<u>123.71</u>		<u>\$42.98</u>

OTHER DIRECT COSTS

Contract, IAG, SCA, Misc.NO	Voucher Number	Treasury Schedule Date	Site Amount	Annual/SMO Allocation Costs	Ind. Rate (%)	Indirect Costs
68-W0-0113	97-LOT0012	12/06/2007	458.39	133.06	34.74%	205.47
	Z-LOT0012	06/24/2008	5,948.21	1,726.63	34.74%	2,666.24
			34.66	10.06	34.74%	15.54

Report Date: 03/29/2012

Section 13 - Page 3 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

OTHER DIRECT COSTS

<u>Contract, IAG, SCA, Misc.NO</u>	<u>Voucher Number</u>	<u>Treasury Schedule Date</u>	<u>Site Amount</u>	<u>Annual/SMO Allocation Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
68-W0-0113	Z-LOT0012	06/24/2008	6.22 6,447.48	1.81 1,871.56	34.74%	2.79 \$2,890.04
EPW06072	43-LOT0002	10/10/2007	-911.05 -911.05	-123.00 -123.00	34.74%	-359.23 \$-359.23
Total Fiscal Year 2008 Other Direct Costs:			5,536.43	1,748.56		\$2,530.81
Total Fiscal Year 2008:			7,408.70			\$2,573.79

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
COAKLEY, ROY W.	2010	16	67.64	26.57%	17.97
			67.64		\$17.97
DAVIS, ELIZABETH	2010	16	533.68	26.57%	141.80
		17	751.11	26.57%	199.57
		18	158.13	26.57%	42.02
		19	1,581.30	26.57%	420.15
		20	355.78	26.57%	94.53
		21	2,253.33	26.57%	598.71
		22	1,166.20	26.57%	309.86
			849.95	26.57%	225.83
			20.05	26.57%	5.33
			7,669.53		\$2,037.80

Report Date: 03/29/2012

Section 13 - Page 4 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
HARKAY, JAMES D.	2010	12	232.55	26.57%	61.79
			232.55		\$61.79
LEUNG, CHRISTINA	2010	25	1,942.33	26.57%	516.08
		26	3,659.18	26.57%	972.24
			5,601.51		\$1,488.32
MUGDAN, WALTER E.	2010	12	49.01	26.57%	13.02
			49.01		\$13.02
SHERIDAN, PATRICIA A.	2010	25	356.44	26.57%	94.71
		26	392.10	26.57%	104.18
			748.54		\$198.89
SOLECKI, MICHAEL F.	2010	26	3,214.26	26.57%	854.03
			3,214.26		\$854.03
TRUONO-WIGGETT, MARISSA	2010	14	65.81	26.57%	17.49
		16	1,020.02	26.57%	271.02
		17	131.61	26.57%	34.97
		18	98.73	26.57%	26.23
		19	67.64	26.57%	17.97
			1,383.81		\$367.68

Report Date: 03/29/2012

Section 13 - Page 5 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
WILSON, ERIC	2010	12	76.33	26.57%	20.28
			76.33		\$20.28

Total Fiscal Year 2010 Payroll Direct Costs:	<u>19,043.18</u>	<u>\$5,059.78</u>
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TRAVEL DIRECT COSTS

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
DALOIA, JAMES J.	0QLKIP	06/14/2010	273.11	26.57%	72.57
			273.11		\$72.57
DAVIS, ELIZABETH	0QLU3B	06/23/2010	194.50	26.57%	51.68
			194.50		\$51.68
NACE, CHARLES G., JR.	0QLBDQ	07/01/2010	200.50	26.57%	53.27
			200.50		\$53.27
SOLECKI, MICHAEL F.	0QLSGW	06/18/2010	224.11	26.57%	59.54
			224.11		\$59.54
Total Fiscal Year 2010 Travel Direct Costs:			<u>892.22</u>		<u>\$237.06</u>

Report Date: 03/29/2012

Section 13 - Page 6 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

OTHER DIRECT COSTS

<u>Contract, IAG, SCA, Misc.NO</u>	<u>Voucher Number</u>	<u>Treasury Schedule Date</u>	<u>Site Amount</u>	<u>Annual/SMO Allocation Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
EP102000018	2200019415	06/22/2010	48.61	0.00	26.57%	12.92
			48.61	0.00		\$12.92
EPD05088	74	05/21/2010	533.98	9.17	26.57%	144.31
	75	06/25/2010	2,754.42	47.30	26.57%	744.42
	76	08/03/2010	475.83	8.17	26.57%	128.60
			342.24	5.88	26.57%	92.50
	77	08/18/2010	754.13	12.95	26.57%	203.81
	78	09/17/2010	603.19	10.36	26.57%	163.02
			5,463.79	93.83		\$1,476.66
Total Fiscal Year 2010 Other Direct Costs:			5,512.40	93.83		\$1,489.58
Total Fiscal Year 2010:			25,541.63			\$6,786.42

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
BRANDON-BAZILE, KIM	2011	02	17.62	26.57%	4.68
			17.62		\$4.68
CAPON, VIRGINIA F.	2011	17	268.58	26.57%	71.36
		21	47.49	26.57%	12.62
		24	569.86	26.57%	151.41
			885.93		\$235.39
DAVIS, ELIZABETH	2011	04	75.56	26.57%	20.08
			113.35	26.57%	30.12
		07	39.67	26.57%	10.54

Report Date: 03/29/2012

Section 13 - Page 7 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
DAVIS, ELIZABETH	2011	12	278.14	26.57%	73.90
		14	298.01	26.57%	79.18
		15	99.33	26.57%	26.39
		16	814.54	26.57%	216.42
		17	2,463.51	26.57%	654.55
		18	1,551.08	26.57%	412.12
		19	571.45	26.57%	151.83
		20	61.22	26.57%	16.27
		21	1,530.65	26.57%	406.69
		22	820.65	26.57%	218.05
		23	1,326.57	26.57%	352.47
		24	1,653.12	26.57%	439.23
		25	367.36	26.57%	97.61
		26	346.95	26.57%	92.18
		27	101.79	26.57%	27.05
			12,512.95		\$3,324.68
LEUNG, CHRISTINA	2011	01	214.53	26.57%	57.00
		02	1,083.28	26.57%	287.83
		03	3,284.81	26.57%	872.77
		04	377.28	26.57%	100.24
		18	218.00	26.57%	57.92
			5,177.90		\$1,375.76
PRINCE, GEORGE R.	2011	03	3,629.74	26.57%	964.42
			3,629.74		\$964.42
ROTOLA, JOSEPH D.	2011	20	194.99	26.57%	51.81
			194.99		\$51.81
TRUONO-WIGGETT, MARISSA	2011	03	135.81	26.57%	36.08

Report Date: 03/29/2012

Section 13 - Page 8 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
TRUONO-WIGGETT, MARISSA	2011	12	237.67	26.57%	63.15
		17	169.76	26.57%	45.11
			543.24		\$144.34
WALL, STEVEN	2011	02	725.96	26.57%	192.89
			725.96		\$192.89
WILSON, ERIC	2011	18	78.77	26.57%	20.93
		25	728.68	26.57%	193.61
		26	80.97	26.57%	21.51
			888.42		\$236.05
Total Fiscal Year 2011 Payroll Direct Costs:			24,576.75		\$6,530.02

TRAVEL DIRECT COSTS

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
DALOIA, JAMES J.	0QZ5IY	10/01/2010	285.51	26.57%	75.86
	0R2ZC5	11/18/2010	416.50	26.57%	110.67
			702.01		\$186.53
LEUNG, CHRISTINA	0R2QD9	01/03/2011	557.00	26.57%	148.00
			557.00		\$148.00
PRINCE, GEORGE R.	0R1J1J	11/26/2010	1,174.36	26.57%	312.03
			1,174.36		\$312.03

Report Date: 03/29/2012

Section 13 - Page 9 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

TRAVEL DIRECT COSTS

<u>Traveler/Vendor Name</u>	<u>Travel Number</u>	<u>Treasury Schedule Date</u>	<u>Travel Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
SOLECKI, MICHAEL F.	0QX0IV	10/25/2010	519.74	26.57%	138.10
			519.74		\$138.10
SOLECKI, MICHAEL F.	0R07EA	11/12/2010	451.69	26.57%	120.02
			451.69		\$120.02
Total Fiscal Year 2011 Travel Direct Costs:			<u>3,404.80</u>		<u>\$904.68</u>

OTHER DIRECT COSTS

<u>Contract, IAG, SCA, Misc.NO</u>	<u>Voucher Number</u>	<u>Treasury Schedule Date</u>	<u>Site Amount</u>	<u>Annual/SMO Allocation Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
EPD05088	79	10/19/2010	474.16	8.14	26.57%	128.15
			474.16	8.14		\$128.15
EPW06072	138-LOT0002	11/09/2010	853.71	115.26	26.57%	257.46
	138-LOT0001	11/09/2010	10,428.28	1,407.94	26.57%	3,144.88
	140-LOT0002	12/14/2010	587.59	79.33	26.57%	177.20
			1,215.00	164.04	26.57%	366.41
	140-LOT0001	12/14/2010	10,904.69	1,472.26	26.57%	3,288.56
	147-LOT0002	01/05/2011	6,215.43	839.16	26.57%	1,874.40
	149-LOT0001	01/13/2011	2,802.90	378.43	26.57%	845.28
	149-LOT0002	01/13/2011	348.29	47.02	26.57%	105.03
			8,305.50	1,121.34	26.57%	2,504.71
			1,184.07	159.86	26.57%	357.08
	155-LOT0002	02/11/2011	292.95	39.55	26.57%	88.35
	155-LOT0001	02/11/2011	1,454.81	196.42	26.57%	438.73
	162-LOT0002	02/11/2011	578.90	78.16	26.57%	174.58
	155-LOT0002	02/11/2011	11,760.00	1,587.74	26.57%	3,546.49
	166-LOT0002	03/09/2011	4,594.48	620.31	26.57%	1,385.57
	163-LOT0001	03/09/2011	880.21	118.84	26.57%	265.45

Report Date: 03/29/2012

Section 13 - Page 10 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

OTHER DIRECT COSTS

Contract, IAG, SCA, Misc.NO	Voucher Number	Treasury Schedule Date	Site Amount	Annual/SMO Allocation Costs	Ind. Rate (%)	Indirect Costs
EPW06072	185-LOT0001	08/12/2011	419.39	56.62	26.57%	126.48
			62,826.20	8,482.28		\$18,946.66
EPW09031	BVN0013	12/27/2010	6,401.13	0.00	26.57%	1,700.78
	BVN0014	01/28/2011	-6,401.13	0.00	26.57%	-1,700.78
			10,274.94	0.00	26.57%	2,730.05
	BVN0015	02/25/2011	552.04	0.00	26.57%	146.68
	BVN0019	06/21/2011	26.45	0.00	26.57%	7.03
			10,853.43	0.00		\$2,883.76
Total Fiscal Year 2011 Other Direct Costs:			74,153.79	8,490.42		\$21,958.57
Total Fiscal Year 2011:			110,625.76			\$29,393.27

PAYROLL DIRECT COSTS

Employee Name	Fiscal Year	Pay Period	Payroll Costs	Ind. Rate (%)	Indirect Costs
BERNS, CAROL Y.	2012	03	170.78	26.57%	45.38
			170.78		\$45.38
DAVIS, ELIZABETH	2012	02	119.22	26.57%	31.68
		03	1,051.12	26.57%	279.28
		04	194.65	26.57%	51.72
		05	77.86	26.57%	20.69
			1,442.85		\$383.37

Report Date: 03/29/2012

Section 13 - Page 11 of 11

Certified By Financial Management Office

EPA Indirect Costs

W R GRACE, BRUTUS, NY, WEEDSPORT, NY SITE ID = 02 XM

All costs through 12/31/2011

PAYROLL DIRECT COSTS

<u>Employee Name</u>	<u>Fiscal Year</u>	<u>Pay Period</u>	<u>Payroll Costs</u>	<u>Ind. Rate (%)</u>	<u>Indirect Costs</u>
TRUONO-WIGGETT, MARISSA	2012	03	68.02	26.57%	18.07
			68.02		\$18.07
WILSON, ERIC	2012	02	162.18	26.57%	43.09
		03	241.38	26.57%	64.13
			403.56		\$107.22
Total Fiscal Year 2012 Payroll Direct Costs:			2,085.21		\$554.04
Total Fiscal Year 2012:			2,085.21		\$554.04
Total EPA Indirect Costs					\$50,949.32

APPENDIX C



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NEW YORK 10007-1866**

Removal Cost Estimate for WR Grace Superfund Site, Weedsport, NY

1. Installation and maintenance of a chain link security fence along the northern border of the Site near Dunn Road;
2. Excavation of all soil containing amphibole asbestos fibers (hereinafter collectively referred to as "asbestos fibers"), greater than or equal to 0.25%. Once the cleanup standard of less than 0.25% is achieved, activity-based sampling shall be conducted in the excavation area using a clearance standard of 0.01 fibers per cubic centimeter ("f/cc") in air to confirm that the cleanup level of 0.25% has been achieved;
3. Post-removal Site controls, including institutional controls, if determined to be necessary based on the results of the activity-based sampling if such sampling shows that the Site does not allow for unlimited use and unlimited exposure;
4. Building decontamination including cleaning the inside of the building and capturing all rinsate, if such rinsate is used (with proper off-Site disposal of rinse water), in order to remove asbestos fibers and materials containing such asbestos fibers from the building;
5. Post-decontamination clearance sampling to ensure that indoor air within the building meets risk-based criteria of 0.01 f/cc utilizing aggressive air sampling procedures and using methods specifically designed for counting asbestos structures classified as Phase Contrast Microscopy Equivalent fibers;
6. Proper characterization, transportation and off-Site disposal of the contaminated soil and any waste generated during building decontamination;
7. Post-excavation soil sampling and analysis at the Site to ensure the asbestos contamination in the soil is less than 0.25% in samples collected and analyzed using the methods described in the Administrative Order Index Number CERCLA-02-2012-2003; and
8. Backfilling of excavation areas and Site restoration;

EPA EXTRAMURAL COSTS

(Emergency and Rapid Response Services Removal Support Team)	\$2,550,000
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EPA INTRAMURAL COSTS

	<u>\$50,000</u>
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TOTAL EPA EXTRAMURAL & INTRAMURAL COSTS	\$2,600,000
---	-------------

CONTINGENCY (20% of total extra/intramural costs rounded to the nearest thousand)	<u>\$520,000</u>
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SUBTOTAL	\$3,120,000
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INDIRECT COSTS (26.57%)	\$828,984
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TOTAL PROJECT	<u>\$ 3,948,984</u>
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APPENDIX D



Standard Operating Procedures of CARB 435 Analysis

Bata Laboratories, Inc.

Rev. 1, Dec. 30, 2010

Statement: In all circumstances, if any part of this SOP is in contradiction to the publication of CARB 435 method, the later will dictate.

Reference: State of California Air Resources Board Method 435 (CARB 435): Determination of Asbestos Content of Serpentine Aggregate, June 6, 1991. See Attachment 1.

Synopsis: This SOP is an operable version of CARB 435 that is developed to take consideration of current laboratory practices and for various materials in testing. This SOP is written in accordance with CARB 435 and may also yield better accuracy for certain materials that are not covered in the original method. This SOP also adopted the option to use a higher magnification for counting fibers that would have not been able to resolve at the traditional 100x magnification as defined in the original CARB 435 method. This SOP applies to all materials that can be requested for CARB 435 analysis, including surface aggregates, pavements, concrete, soils, solid wastes, building materials, etc.

Safety: All milling and sample preparation should be conducted in a safe HEPA ventilation hood. A half-face respirator and a full Tyvek suit as the minimal protection.

Operating Procedures:

1. Sample Receiving, login, rejection, and disposal: Follow the guidelines in Quality Control/Quality Assurance Program for Bulk Asbestos Analysis, 4th Edition, 2008.
2. Sample Preparation: Follow guidelines in CARB 435 for sample mixing and grinding steps from pages 3-7. The following are key steps that need to be observed during preparation:
 1. Drying the sample if wet. The minimum drying time for a 9 oz moist sample is 24 hr. Longer time is needed according to the sample amount.
 2. Making aliquot for sample prep and analysis: always mix the sample well before dividing into four equal quadrants on a sheet of clean paper.
 3. Using play sand to clean the grinder between each sample.
 4. Hand milling is only applicable if called for by clients and/or on clay materials only to avoid clogging of the machine grinder.



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3. Sample Analysis: Follow the guidelines in section 8.0 of CARB 435 (pages 11-13) to proceed with the analysis with the following key steps to be carefully observed:
 1. Use 100x for preliminary quantitation of point counting.
 2. At the completion of 100x, always visually inspect under 400x. Define as Trace (or TR) when fibers are observed under 400x, but not under 100x.
 3. If a significant amount of fiber contents observed under 400x magnification, a 400-point should be performed following the CARB 435 point procedures. Define as Trace or TR if none of the fibers fall under the points.



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Attachment 1: CARB 435 Method



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California Environmental Protection Agency

AIR RESOURCES BOARD

Method 435

Determination of Asbestos Content of Serpentine Aggregate

Adopted: June 6, 1991



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Method 435

Determination of Asbestos Content of Serpentine Aggregate

1 PRINCIPLE AND APPLICABILITY

1.1 Principle

Asbestos fibers may be released from serpentine rock formations and are determined by microscopic techniques. The results are very sensitive to sampling procedures. The analytical results are reported in percent asbestos fibers which is the percent number of asbestos fibers contained in 400 randomly chosen particles of a bulk sample. Since the homogeneity of the material is unknown, the uncertainty in the sampling cannot be defined. The uncertainty of the analytical technique is two percent if twenty asbestos fibers are counted in a sample of 400 particles. The derivation of this uncertainty value is explained in Section 7.4.

1.2 Applicability

This method is applicable to determining asbestos content of serpentine aggregate in storage piles, on conveyor belts, and on surfaces such as roads, shoulders, and parking lots.

2 DEFINITIONS

2.1 Bulk Sample

A sample of bulk material.

2.2 Grab Sample

A sample taken from a volume of material.

2.3 Composite Sample

A mixture or blend of material from more than one grab sample.

2.4 Serpentine

Serpentinite, serpentine rock or serpentine material.

2.5 Executive Officer

The term Executive Officer as used in this method shall mean the Executive Officer of the Air Resources Board (ARB) or Air Pollution Control



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Officer/Executive Officer of a local air pollution control district/air quality management district.

3 APPLICABLE SOURCES

This method can be used to obtain bulk material samples from three types of sources:

1. Serpentine aggregate storage piles
2. Serpentine aggregate conveyor belts
3. Serpentine aggregate covered surfaces

4 SAMPLING APPARATUS

4.1 Serpentine Aggregate Storage Piles

Tube insertion often provides the simplest method of aggregate material investigation and sampling. Insertion tubes shall be adequate to provide a relatively rapid continuous penetration force.

4.1.1 Thin-walled tubes should be manufactured as shown in Figure 1. The tube should have an outside diameter between 2 to 5 inches and be made of metal or plastic having adequate strength for penetration into aggregate piles. These tubes shall be clean and free of surface irregularities including projecting weld seams. Further information on these tubes can be found in Table 1 and ASTM D 1587-83, which is incorporated herein by reference.

4.1.2 The insertion tube can be made out of commercially available two inch PVC Schedule 40 pipe. Further information on the tube can be found in Table 2.

4.1.3 A round point shovel may be used.

4.2 Serpentine Aggregate Conveyor Belts

4.2.1 Sampling of aggregate off a conveyor belt requires a hand trowel, a small brush, and a dust pan.

4.2.2 Two templates as shown in Figure 2 are needed to isolate material on the conveyor belt.

4.2.3 An automated belt sampler may be used.



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Method 230-10



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Page 2
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4.3 Serpentine Aggregate Covered Surfaces

A shovel, a hand or machine-operated auger or other suitable equipment can be used to collect samples of aggregate materials on covered surfaces.

4.3.1 Hand-Operated Augers.

4.3.1.1 Helical Augers-Small lightweight augers such as spiral-type augers and ship-type augers may be used. A description of these augers can be found in ASTM D1452-80, which is incorporated herein by reference.

4.3.1.2 Orchard barrel and open spiral-type tubular augers may be used to collect samples. These augers range in size from 1.5 through 8 inches, and have the common characteristic of appearing essentially tubular when viewed from the digging end. Further description of these auger types can be found in ASTM D1452-80.

4.3.1.3 Clam Shell or Iwan-Type post-hole augers may be used to collect samples from surfaces generally 2 through 8 inches in diameter and have a common mean of blocking the escape of soil from the auger. Further description of these augers can be found in ASTM D1452-80.

4.3.2 Machine-Operated Augers

Machine-Operated Augers such as helical augers and stinger augers may be used. These augers are normally operated by heavy-duty, high-torque machines, designed for heavy construction work. Further description of these augers can be found in ASTM D1452-80.

4.3.3 A round point shovel can also be used to obtain a sample of aggregate covered surface material.

5 SAMPLING

The sampling procedure has been developed to provide an unbiased collection of bulk samples. A sampling plan, including a description of how the grab samples will be randomly collected and the number of samples to be collected, shall be developed. Prior to conducting any sampling the sampling plan shall be submitted to the Executive Officer for approval, if the sampling is conducted for determining compliance with a rule or regulation. The amount of composite 200 mesh material, as described below, shall be sufficient to provide a sample to the source or Executive Officer, if requested, and a sample to be archived for future use.

A single test as described below shall cover:

a) 1000 tons of aggregate for piles and conveyor belts, or



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Method 435

Page 3

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- b) one acre aggregate covered surface, or
c) one mile of aggregate covered road, or
d) two acres or two miles of dual aggregate covered shoulders.

Exposure to airborne asbestos fibers is a health hazard. Asbestos has been listed by the Governor as causing cancer and identified by the Air Resources Board as a toxic air contaminant. Serpentine aggregate may contain asbestos. Bulk samples collected can contain friable asbestos fibers and may release fibers during sampling, handling or crushing steps. Adequate safety precautions should be followed to minimize the inhalation of asbestos fibers. Crushing should be carried out in a ventilated hood with continuous airflow (negative pressure) exhausting through an HEPA filter. Handling of samples without these precautions may result in the inhalation of airborne asbestos fibers.

5.1 Serpentine Aggregate Storage Piles

Serpentine aggregate storage piles typically have a conical or a triangular prism shape. The aggregate is introduced at the top of the pile and is allowed to flow over the side. This action, called sloughing, causes a size segregation to occur with the finer material deposited towards the top of the pile.

The locations where grab samples will be taken are randomly chosen over the surface of the pile. The method of randomly choosing the sampling locations is left up to sampling personnel but must follow the procedures specified in the sampling plan. For 1000 tons of product, a grab sample shall be taken at a minimum of three randomly chosen sampling locations. A minimum of three grab samples shall be taken even if the product pile contains less than 1000 tons of material. The slough is raked or shoveled away from the sampling location. A sampling apparatus is inserted one foot into the pile and the material is removed and is placed in an appropriate sized sampling container. Some of the possible sampling apparatus is discussed in Section 4.1. Each of the grab samples shall be placed in the same sample container. This composited sample shall be crushed to produce a material with a nominal size of less than three-eighths of an inch. Before crushing, the sample must be adequately dried. ASTM Method C-702-80, which is incorporated herein by reference, shall be used to reduce the size of the crushed grab sample to a one pint aliquot. The one pint aliquot shall be further crushed using a Braun mill or equivalent to produce a material of which the majority shall be less than 200 Tyler mesh. An aliquot of the 200 mesh material shall be put into a labeled sealed container. The label shall contain all the information described in Section 6 (except item 4).

5.2 Serpentine Aggregate Conveyor Belts.

Serpentine aggregate is transported from the rock crushing plant to a product stacking belt and finally to a storage pile or to a waiting truck for delivery to a buyer.



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The grab samples shall be taken from the product stacking belt or if this is not possible then at the first transfer point before the stockpile. The grab samples shall be collected by stopping the belt a minimum of three times or using an automated sampler. The method of randomly choosing the sampling locations and intervals is left up to sampling personnel but must follow the procedure specified in the sampling plan. For 1000 tons of product, a grab sample is taken at a minimum of three randomly selected intervals. A minimum of three samples shall be taken even if the generated product is less than 1000 tons. Each time the belt is stopped to take a grab sample, templates, as shown in Figure 2, are placed a minimum of six inches apart to isolate the material on the belt.. The material within the templates is removed with a small shovel or with a brush and a dust pan for the finer material and is placed in an appropriate sized sampling container. Each of the grab samples shall be placed in the same sample container. This composited sample shall be crushed to produce a material with a nominal size of less than three-eighths of an inch. Before crushing, the sample must be adequately dried. ASTM Method C-702-80, which is incorporated herein by reference, shall be used to reduce the size of the crushed grab sample to a one pint aliquot. The one pint aliquot shall be further crushed using a Braun mill or equivalent to produce a material which the majority of which shall be less than 200 Tyler mesh. An aliquot of the 200 mesh material shall be put into a labeled sealed container. The label must contain all the information listed in Section 6 (except item 4).

5.3 Serpentine Aggregate Covered Surfaces

5.3.1 Serpentine Aggregate Covered Roads

A serpentine aggregate-covered road shall be characterized by taking grab samples from a minimum of three randomly chosen locations per mile of road. The method of randomly choosing the sampling locations is left up to sampling personnel but must follow the procedures specified in the sampling plan. A minimum of three samples shall be taken even if the road is less than one mile long. Section 4.3 describes some of the possible sampling apparatus used to collect the grab samples. Grab samples shall not contain underlying soils. Each of the grab samples shall be placed in the same sample container. This composited sample shall be crushed to produce a material with a nominal size of less than three-eighths of an inch. Before crushing, the sample must be adequately dried. ASTM Method C-702-80 shall be used to reduce the size of the crushed grab sample to a one pint aliquot. The one pint aliquot shall be further crushed using a Braun mill or equivalent to produce a material which the majority shall be less than 200 Tyler mesh. An aliquot of the 200 mesh material shall be put into a labeled sealed container. The label must contain all the information listed in Section 6 (except item 4).

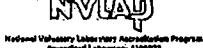


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Method 430

Page 5

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5.3.2 Serpentine Aggregate Covered Areas

A serpentine aggregate-covered play yard or parking lot shall be characterized by taking grab samples from a minimum of three randomly chosen locations per acre. The method of randomly choosing the sampling locations is left up to sampling personnel but must follow the procedure specified in the sampling plan. A minimum of three samples shall be taken even if the area is less than one acre. Section 4.3 describes some of the possible sampling apparatus for collecting the sample. Grab samples shall not contain underlying soils. Each of the grab samples shall be placed in the same sample container. This composited sample shall be crushed to produce a material with a nominal size of less than three-eighths of an inch. Before crushing, the sample must be adequately dried. ASTM Method C-702-80 shall be used to reduce the size of the crushed grab sample to a one pint aliquot. The one pint aliquot shall be further crushed using a Braun mill or equivalent to produce a material which the majority shall be less than 200 Tyler mesh. An aliquot of the 200 mesh material shall be put into a labeled sealed container. The label must contain all the information listed in Section 6 (except item 4).

5.3.3 Serpentine Aggregate Covered Road Shoulders

The sampling procedure specified in Section 5.3.1 or 5.3.2 shall be used for road shoulders covered with serpentine aggregate. The only difference is that a minimum of three grab samples shall be taken over a length of two miles of shoulder or over an area of two acres of shoulder surface. The word shoulder is meant to imply shoulders on both sides of the road. For serpentine aggregated covered shoulders, the sampling plan specified in Section 5 shall indicate whether the samples are collected on a two mile or two acre basis.

6 SAMPLING LOG

A sample log must be kept showing:

- 1) A unique sample number.
- 2) Facility name.
- 3) Facility address or location where sample is taken.
- 4) A rough sketch, video tape, or photograph of the specific sampling locations.
- 5) Date and time of sampling.
- 6) Name of person performing sampling.



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7 ANALYTICAL PROCEDURE

7.1 Principle and Applicability

Samples of serpentine aggregate taken for asbestos identification are first examined for homogeneity and preliminary fiber identification at low magnification. Positive identification of suspect fibers is made by analysis of subsamples with the polarized light microscope.

The principles of optical mineralogy are well established.^{2,3} A light microscope equipped with two polarizing filters coupled with dispersion staining is used to observe specific optical characteristics of a sample. The use of plane polarized light allows the determination of refractive indices along specific crystallographic axes. Morphology and color are also observed. A retardation plate is placed in the polarized light path for determination of the sign of elongation using orthoscopic illumination. Orientation of the two filters such that their vibration planes are perpendicular (crossed polars) allows observation of the birefringence and extinction characteristics of anisotropic particles.

Quantitative analysis involves the use of point counting. Point counting is a standard technique in petrography for determining the relative areas occupied by separate minerals in thin sections of rock. Background information on the use of point counting³ and the interpretation of point count data⁴ is available.

This method is applicable to all bulk samples of serpentine aggregate submitted for identification and quantification of asbestos components.

7.2 Range

The analytical method may be used for analysis of samples containing from 0 to 100 percent asbestos. The upper detection limit is 100 percent. The lower detection limit is 0.25 percent.

7.3 Interferences

Fibrous organic and inorganic constituents of bulk samples may interfere with the identification and quantitation of the asbestos content. Fine particles of other materials may also adhere to fibers to an extent sufficient to cause confusion in the identification.

7.4 Analytical Uncertainty

The uncertainty method is two percent if twenty asbestos fibers are counted in a sample of 400 particles. The uncertainty of the analytical method may be assessed by a 95% confidence interval for the true percentage of asbestos fibers in the rock. The number of asbestos fibers in the sample is assumed to have a



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binomial distribution. If twenty asbestos fibers are found in a sample of 400 particles, a one-sided confidence interval for the true percentage has an upper bound of seven percent or an analytical uncertainty of two percent.¹¹ The confidence interval used here is an "exact" interval computed directly from the binomial distribution.

7.5 Apparatus

7.5.1 Microscope

A low-power binocular microscope, preferably stereoscopic, is used to examine the bulk sample as received.

- * Microscope: binocular, 10-45X
- * Light Source: incandescent, fluorescent, halogen or fiber optic
- * Forceps, Dissecting Needles, and Probes
- * Glassine Paper, Clean Glass Plate, or Petri dish
- * Compound microscope requirements: A polarized light microscope complete with polarizer, analyzer, port for wave retardation plate, 360° graduated rotating stage, substage condenser, lamp, and lamp irls
- * Polarized Light Microscope: described above
- * Objective Lenses: 10X
- * Dispersion Staining Objective Lens: 10X
- * Ocular Lens: 10X
- * Eyepiece Reticule: 25 point or 100 point Chalkley Point Array or cross-hair
- * Compensator Plate: 550 millimicron retardation
- * First Order Red I Compensator: 530 nanometers

7.6 Reagents

Refractive Index Liquids: 1.490 - 1.570, 1.590 - 1.720 in increments of 0.002 or 0.004.



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Method 435

Page 8

NEWARK, DE • GEORGETOWN, DE • PHILADELPHIA, PA

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Refractive Index Liquids for Dispersion Staining: High-dispersion series, 1.550, 1.605, 1.630 (optional).

UICC Asbestos Reference Sample Set: Available from UICC MRC Pneumoconiosis Unit, Lisndough Hospital Penarth, Glamorgan CF6 1xw, UK and commercial distributors.

Tremolite-asbestos: Available from J. T. Baker.

Actinolite-asbestos: Available from J. T. Baker.

Chrysotile, Amosite, and Crocidolite is available from the National Institute of Standards and Technology.

Anthophyllite, Tremolite, Actinolite will be available from the National Institute of Standards and Technology during the first quarter of 1990.

8 PROCEDURES

Exposure to airborne asbestos fibers is a health hazard. Bulk samples submitted for analysis are usually friable and may release fibers during handling or matrix reduction steps. All samples and slide preparations should be carried out in a ventilated hood or glove box with continuous airflow (negative pressure) exhausting through an HEPA filter. Handling of samples without these precautions may result in exposure of the analyst and contamination of samples by airborne fibers.

8.1 Sample Preparation

An aliquot of bulk material is removed from the one pint sample container. The aliquot is spread out on a glass slide. A drop of staining solution with appropriate refractive index is added to the aliquot. A cover slide is placed on top of the sample slide.

The first preparation should use the refractive index solution for Chrysotile. If during the identification phase other asbestos forms are suspected to be present in the sample, due to their morphology, then additional analyses shall be performed with the appropriate solutions. Report the percentages of each asbestos form and combine percentages to determine total asbestos concentrations.

8.2 Fiber Identification

Positive identification of asbestos requires the determination of the following optical properties:

Morphology (3 to 1 minimum aspect ratio)
Color and pleochroism



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Method 435

Page 9

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Refractive indices
Birefringence
Extinction characteristics
Sign of elongation

Table 3 lists the above properties for commercial asbestos fibers. Natural variations in the conditions under which deposits of asbestos minerals are formed will occasionally produce exceptions to the published values and differences from the UICC standards. The sign of elongation is determined by use of the compensator plate and crossed polars. Refractive indices may be determined by the Becke line test. Becke line test or dispersion staining shall be used to identify asbestos fibers. Central stop dispersion staining colors are presented in Table 4. Available high-dispersion (HD) liquids should be used.

8.3 Quantification of Asbestos Content

Asbestos quantification is performed by a point-counting procedure. An ocular reticle (point array) or cross-hair is used to visually superimpose points on the microscope field of view. The point counting rules are as follows:

1. Record the number of points positioned directly above each particle or fiber.
2. Record only one point if two points are positioned over same particle or fiber.
3. Record the number of points positioned on the edge of a particle or fiber.
4. If an asbestos fiber and a matrix particle overlap so that a point is superimposed on their visual intersection, a point is scored for both categories.
5. If a test point lies over an ambiguous structure, no particle or fiber is recorded. Examples of "ambiguous" structures are:
 - a) fibers whose dispersion colors are difficult to see
 - b) structures too small to categorize
6. A fiber mat or bundle is counted as one fiber.

For the purpose of the method, "asbestos fibers" are defined as mineral fibers having an aspect ratio greater than 3:1 and being positively identified as one of the minerals in Table 3.

A total of 400 points superimposed on either asbestos fibers or nonasbestos matrix material must be counted over at least eight different preparations of representative subsamples. Take eight forceps samples and mount each



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Method 435

Page 10
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separately with the appropriate refractive index liquid. The preparation should not be heavily loaded. The sample should be uniformly dispersed to avoid overlapping particles and allow 25 - 50 percent empty area within the fields of view. Count 50 nonempty points on each preparation, using either

A reticle with 100 points (Chalkley Point Array) and counting 25 points in at least two randomly selected fields.

or

A reticle with 25 points (Chalkley Point Array) and counting at least two randomly selected fields.

or

A reticle with a standard cross-hair and counting at least 50 randomly selected fields.

For samples with mixtures of isotropic and anisotropic materials present, viewing the sample with slightly uncrossed polars or the addition of the compensator plate to the polarized light path will allow simultaneous discrimination of both particle types. Quantitation should be performed at 100X. Confirmation of the quantitation result by a second analyst on 10 percent of the analyzed samples should be used as standard quality control procedure. All optical properties in Section 8.2 shall be determined to positively identify asbestos.

EXCEPTION I

If the sample is suspected of containing no asbestos a visual technique can be used to report that the sample does not contain asbestos. The rules are as follows:

1. Prepare three slides as described in Section 8.3.
2. View 10 fields per preparation. Identify all fibers.
3. If all fibers are nonasbestos, report no asbestos were found and that visual technique was used.
4. If one fiber is determined to be asbestos, discontinue the visual method and perform the point counting technique as described above.

EXCEPTION II

If the sample is suspected to have an asbestos content in excess of ten percent, a visual technique can be used to report that the sample contains greater than



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ten percent asbestos. The standard operating procedure of the visual technique allowed in the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program, Bulk Asbestos Handbook, National Institute of Standards and Technology publication number NISTIR 88-3879 dated October 1988, which is incorporated herein by reference, shall be followed.

9.0 CALCULATIONS

The percent asbestos is calculated as follows:

$$\% \text{ asbestos} = (a/n) 100\%$$

a = number of asbestos counts,
n = number of nonempty points counted (400)

If $a = 0$, report "No asbestos detected"
If $a > 0$, report the calculated value to the nearest 0.25%

If "no asbestos detected" is reported by the point counting technique, the analyst may report the observation of asbestos fibers in the non-counted portions of the sample.

10.0 ALTERNATIVE METHODS

10.1 Alternative Sampling Methods

Alternate sampling methods may be used as long as they are substantially equivalent to the sampling methods discussed in Section 5 and approved by the Executive Officer of the Air Resources Board. The ARB Executive Officer may require the submittal of test data or other information to demonstrate equivalency.

10.2 Analytical Methods

An alternative analytical method may be used as long as it produces results substantially equivalent to the results produced by the point counting method and approved by the Executive Officer of the Air Resources Board. The ARB Executive Officer may require the submittal of test data or other information to demonstrate equivalency.

11.0 REFERENCES

- 1) G. S. Koch, Jr., R. F. Link, Statistical Analysis of Geological Data, New York, Dover Publications, Inc., December 1985.
- 2) Paul F. Kerr, Optical Mineralogy, 4th ed., New York, McGraw-Hill, 1977.



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Method 430

Page 12

NEWARK, DE • GEORGETOWN, DE • PHILADELPHIA, PA



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- 3) E.M. Chamot and C. W. Mason, *Handbook of Chemical Microscopy*, Volume One, 3rd ed, New York: John Wiley & Sons, 1958.
- 4) F. Chayes, *Petrographic Model Analysis: An Elementary Statistical Appraisal*, New York: John Wiley & Sons, 1958.
- 5) E. P. Brantly, Jr., K. W. Gold, I. E. Myers, and D. E. Lentzen, *Bulk Sample Analysis for Asbestos Content: Evaluation of the Tentative Method*, U. S. Environmental Protection Agency, October 1981.
- 6) U. S. Environmental Protection Agency, *Asbestos-Containing Materials in School Buildings: A Guidance Document*, Parts 1 and 2 EPA/OTS No. C00090m Narcg 1979.
- 7) D. Lucas, T. Harwell, and A. V. Rao, *Asbestos Containing Materials in School Buildings: Guidance for Asbestos Analytical Programs*, EPA 580/13-80-017a, U. S. Environmental Protection Agency, December 1980.
- 8) D. H. Taylor and J. S. Bloom, *Hexametaphosphate Pretreatment of Insulation Samples for Identification of Fibrous Constituents*, *Microscope*, 28, 1980.
- 9) W. J. Campbell, R. L. Blake, L. L. Brown, E. E. Cather, and J. J. Sjoberg, *Selected Silicate Minerals and Their Asbestiform Varieties: Mineralogical Definitions and Identification-Characterization*, U. S. Bureau of Mines Information Circular 8751, 1977.
- 10) Walter C. McCrone, *Asbestos Particle Atlas*, Ann Arbor, Ann Arbor Science Publishers, June 1980.
- 11) John Moore, Biostatistician, Personnel Communication, February 8, 1990.



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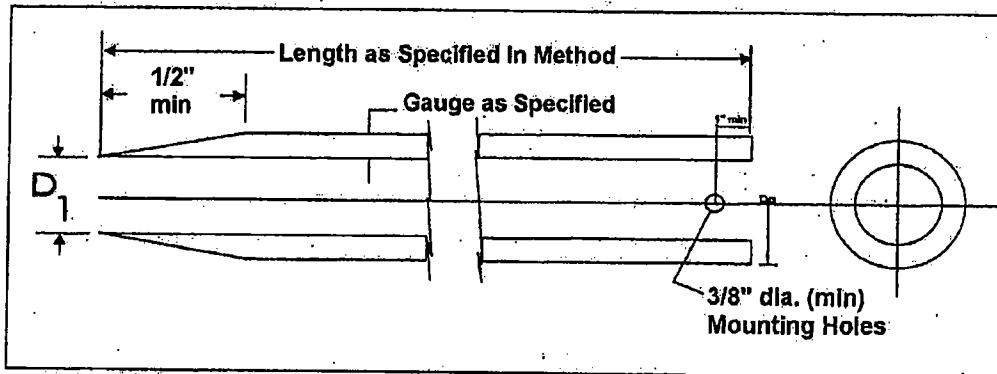
Method 433 NEWARK, DE • GEORGETOWN, DE • PHILADELPHIA, PA

Page 13
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Figure 1

Thin Wall Tube for Sampling



- Note 1 Minimum of two mounting holes on opposite sides for 2 to 3 inch diameter sampler.
- Note 2 Minimum of four mounting holes spaced at 90° for samplers 4 inch diameter and larger.
- Note 3 Tube held with hardened screws.
- Note 4 Two inch outside-diameter tubes are specified with an 18-gauge wall thickness to comply with area ratio criteria accepted for "undisturbed samples." Users are advised that such tubing is difficult to locate and can be extremely expensive in small quantities. Sixteen-gauge tubes are generally readily available.



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Method 435

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Table 1
Suitable Thin Walled Steel Sample Tube^A

OUTSIDE DIAMETER:

inches millimeters	2 50.8	3 76.2	5 127
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WALL THICKNESS:

Bwg inches millimeters	18 0.049 1.24	16 0.065 1.65	11 0.120 3.05
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TUBE LENGTH:

inches meters	36 0.91	36 0.91	54 1.45
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CLEARANCE RATIO, %	1	1	1
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^A The three diameters recommended in Table 1 are indicated for purposes of standardization, and are not intended to indicate that sampling tubes of intermediate or larger diameters are not acceptable. Lengths of tubes shown are illustrative. Proper lengths to be determined as suited to field conditions.



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Method 403



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age 15



Table 2

Dimensional Tolerances for Thin Walled Tubes

Nominal Tube Diameters from Table 1^A Tolerances, inches

Size Outside Diameter	2	3	4
Outside Diameter	+0.007 -0.000	+0.010 -0.000	+0.015 -0.000
Inside Diameter	+0.000 -0.007	+0.000 -0.010	+0.000 -0.015
Wall Thickness	+0.007	+0.010	+0.015
Ovality	0.015	0.020	0.030
Straightness	0.030/ft	0.030/ft	0.030/ft

^A Intermediate or larger diameters should be proportional. Tolerances shown are essentially standard commercial manufacturing tolerances for seamless steel mechanical tubing. Specify only two of the first three tolerances; O. D. and I. D. or O. D. and Wall, or I. D. and Wall.



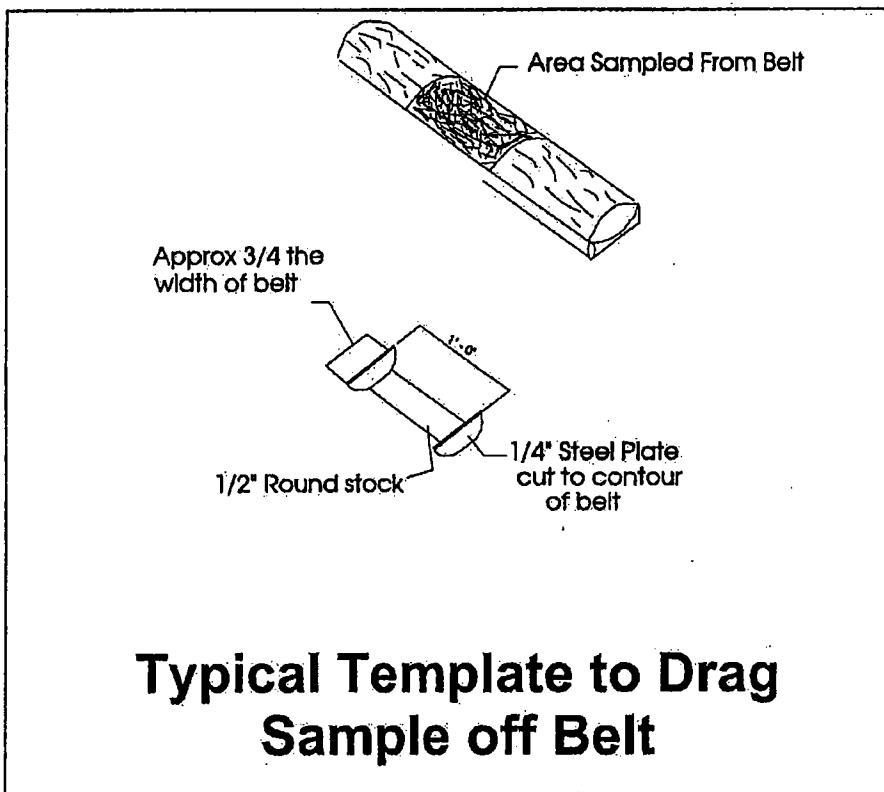
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Figure 2



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Page 17



9 Garfield Way

Table 3

Optical Properties of Asbestos Fibers

Mineral	Morphology ^a , color	Refractive Indices ^b		Birefringence	Extinction	Sign of Elongation
		alpha	gamma			
Chrysotile Asbestiform Serpentine REMARK, FLORIDA 33733	Wavy fibers. Fiber bundles have splayed ends and "kinks." Aspect ratio typically >10:1. Colorless ^c , nonpleochroic.	1.493 - 1.560	1.517 - 1.562 ^f (normally 1.556)	0.002 - 0.014	to fiber length	+ (length slow)
Amosite (asbestiform chrysotite) GEORGIA 31327	Straight, rigid fibers. Aspect ratio typically >10:1. Colorless to brown, nonpleochroic or weakly so. Opaque inclusions may be present.	1.635 - 1.696	1.655 - 1.729 ^f (normally 1.696 - 1.710)	0.020 - 0.33	to fiber length	+ (length slow)
Tremolite Asbestiform Beckeite NEW YORK 100-37-330	Straight, rigid fibers. Thick fibers and bundles common, blue to purple-blue in color. Pleochroic. Birefringence is generally masked by blue color.	1.654 - 1.701	1.668 - 1.717 (normally close to 1.700)	0.014 - 0.016	to fiber length	- (length fast)
Anthophyllite- Asbestos PHILADELPHIA PA 19102	Straight fibers and fiber bundles showing splayed ends. Colorless to light brown. Pleochroism absent.	1.596 - 1.652	1.615 - 1.676 ^f	0.019 - 0.024	to fiber length	+ (length slow)
Tremolite- Actinolite- Asbestos PA 19104 • www.battnaenv.com	Straight and curved fibers and fiber bundles. Large bundles show splayed ends. Tremolite is colorless and actinolite is green. Weakly to moderately pleochroic.	1.599 - 1.668	1.622 - 1.688 ^f	0.023 - 0.020	to fiber length	+ (length slow)

^a From Reference 6; colors cited are seen by observation with plane polarized light.^b From References 7 and 9.

Fibers subjected to heating may be brownish.

Fibers defined as having aspect ratio >3:1.

to fiber length.

|| to fiber length.

June 1991

Method 435

Page 18



Table 4
Central Stop Dispersion Staining Colors^a

Mineral	RI Liquid	$\nu_{\mu \perp}$	$\nu_{\mu \parallel}$
Chrysotile	1.550HD	blue	blue-magenta
Amosite	1.680	blue-magenta to pale blue	golden-yellow
	1.550HD	yellow to white	yellow to white
Crocidolite ^b	1.700	red-magenta	blue-magenta
	1.550HD	yellow to white	yellow to white
Anthophyllite	1.605HD	blue	gold to gold-magenta
Tremolite	1.605HD ^c	pale blue	yellow
Actinolite	1.630HD	gold-magenta to blue	gold
	1.630HD ^c	magenta	golden-yellow

^a From Reference 10.

^b Blue absorption color.

^c Oblique extinction view.



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Page 19